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MALIGNANT DISEASE OF THE TONSILS, WITH TEN ILLUSTRATIVE CASES; THE STATISTICS AND THE BIBLIOGRAPHY OF THE SUBJECT.

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The larger works on general surgery, and even the more recently published books which are devoted by their authors to the special consideration of diseases of the throat, fail to mention, or devote only a limited space to, malignant disease of the tonsils. This circumstance demonstrates one of two facts: either the disease rarely attacks the tonsils, or, until recently, observers have failed to record the cases brought under their notice. That the latter rather than the former is the case is shown by the bibliography appended to this paper, and by the fact that within my own experience I have been called upon to treat ten cases.

The want of attention bestowed upon the subject of this paper is shown by the very brief reference given to malignant disease of the tonsils in one of the best books on diseases of the throat of its time. Sir Morell Mackenzie, in the edition of his book[1] published in 1880, says:

> This is a rare disease, but cases have been reported by Velpeau, Maisonneuve, Lobstein, Lennox Brown, etc. Most of the reported instances belonged to the encephaloid variety, the disease being in some cases primary, and in others due to extension from adjacent parts. I have met with seven cases of cancer of the tonsils, five of which were encephaloid and two scirrhous.

[1] Diseases of the Throat and Nose, vol. i. p. 83.

The statement that malignant disease of the tonsil is rare—a statement which is very generally accepted—seemed to me not to be quite true when I discovered that within seven years I had met with ten cases. It then became evident that the subject was one of much higher importance than is generally admitted. So long as the belief exists that the tonsils are seldom attacked by malignant disease, there is a great liability to the serious nature of the malady being overlooked by general practitioners during its early stage, and mistaken for some acute or subacute inflammatory affection of the gland, or a syphilitic new-formation.

Ten years ago it was with great difficulty that even a few well-authenticated cases could be collected. For example, Mr. Butlin, in his valuable work on *Sarcoma and Carcinoma*, published in 1882, collected nine cases of sarcomatous and three of carcinomatous disease of the tonsil. But since that time observers appear to have been more careful in recording their cases, and by the publication of such admirable compilations as Dr. Semon's "Journal"[1] a research into the literature of the many diseases attacking the upper air-passages has been rendered comparatively easy.

Malignant disease of the tonsil is so fraught with danger, and its consequences are so serious, that it should be the endeavor of all who have any experience to investigate, as far as they can, the means of diagnosticating the disease as early as possible, and add what they can to the methods we possess of alleviating suffering, and, if possible, of saving life.

In carcinomatous disease of the tonsil, as in extrinsic cancer of the larynx, or in epithelioma at the base of the tongue, the lymphatic glands become rapidly involved, whereas in some of the sarcomata, especially in the spindle-celled variety, the tumor may remain encapsuled for a considerable period, and the glands continue unaffected. I shall therefore consider these two forms of malignant disease separately, as far as is consistent with a proper study of the whole subject.

Sarcomatous disease is met with in the tonsils in various forms, but by far the most common variety is the round-celled sarcoma, or lympho-sarcoma, a most virulent disease, and one in which secondary formations rapidly develop. It is a malady in which, even from the onset, little hope can be entertained of saving the patient. Of the fifty-two cases which I have collected nine were stated to be round-celled sarcoma, and eighteen were named lympho-sarcoma; twenty-three of the cases were published as specimens of "sarcoma," the exact variety not being mentioned. One example published by Scheurlen was described as a fibro-sarcoma and another by Gray as an adeno-sarcoma.

[1] Internationales Centralblatt für Laryngologie, Rhinologie, und verwandte Wissenschaften, Berlin.

The following very interesting case illustrates in one individual the points of contrast in the life history of the spindle-celled and the round-celled sarcomata.

CASE I. *Encapsuled spindle-celled sarcoma of left tonsil; slow growth; lymphatic glands not involved; operation through the mouth; no local recurrence five years after operation; second sarcoma formed in right tonsil; rapid involvement of lymphatic glands, palate and pharynx; death from hemorrhage and exhaustion five years and three months after onset of disease in left tonsil.*—Mrs. B., a lady aged fifty-seven years, who always enjoyed good health, and looked much younger than her years, consulted me in November, 1884, regarding a swelling in her left tonsil, which her private medical attendant looked upon as a subacute tonsillitis. He had been employing the usual remedies, but without any good effect; the tonsil continued to increase in size and in hardness, and caused the patient some alarm, but no pain, or even discomfort except by reason of its bulk. I found the left tonsil enlarged, hard, smooth, and freely movable. There was no involvement of the lymphatic glands. She said that she observed the swelling for the first time at the beginning of July, 1884, but paid very little attention to it on account of the freedom from pain. The tonsil increased in size very slowly at first, but during the first fortnight of November its growth has been more rapid. The appearance of the tonsil and the history of the case led me at first to suppose that I had to deal with a chronic interstitial tonsillitis, but by the beginning of December I was convinced that the disease was of a malignant nature, and accordingly determined to operate at once, as the tumor appeared to me to be a favorable one for removal, the lymphatic glands being still free from the disease. Having previously performed tracheotomy, on the 5th of January, 1885, I made an incision through the anterior pillar of the fauces with a knife, and soon came upon a dense fibrous capsule. I then tried to enucleate the tumor with the finger and blunt instruments, but in attempting to do so the capsule ruptured, and the growth became completely broken up. I then cleared out the whole tumor mass with a Volkmann's spoon and subsequently separated the capsule from its surroundings. The opening thus left was dusted with iodoform, and the following day, when bleeding had ceased, the patient was again placed under chloroform, and the whole of the surface from which the tumor was removed was very freely cauterized with a Paquelin's knife. The wound healed quickly, and the patient made such a good recovery that she was able to leave, with her daughter, for the south of France in the second week of February.

Microscopic sections of fragments of the tumor showed it to be a round- and spindle-celled sarcoma. Portions taken from the centre of the growth were composed of moderately large, round nucleated cells, closely aggregated, bound together by an almost homogeneous material, and a very delicate reticulum of what appeared like connective-tissue fibres, but which probably were the walls of blood channels. The peripheral parts of the tumor were formed almost entirely of spindle-cells closely packed together, and presented the typical structure of sarcomatous tissue.

Until the beginning of April, 1889 (four years and nine months after the formation of the sarcoma in the left tonsil, and four years and three months after its removal by operation), the patient enjoyed perfect health,

but about the middle of that month, while residing in Egypt, she felt some discomfort in swallowing, and had a strong inclination to refuse food. This she thought little of, as she had been travelling and the weather had been usually cold, but when, at the end of a fortnight, she found that her throat was getting rapidly worse rather than better, arrangements were made to return home. (Mrs. B. knew the nature of the tumor removed from her left tonsil.) In passing through Paris she consulted, if I remember correctly, M. Ch. Fauvel, who was inclined to take a very serious view of her case, although he did not express a definite opinion regarding the exact nature of her illness.

The patient asked me to see her, which I did on the 14th of May, and then I noticed a great change for the worse since I had met her in September of the previous year. Now her voice and articulation were indistinct, the sense of taste was impaired, there was a continuous and copious discharge of saliva, which she found a difficulty in swallowing while awake, and during sleep it escaped from her mouth in large quantities, soiling the pillows and bed-clothes. Deglutition was not only difficult but painful, and occasionally fluid food escaped into the nostrils. There was no obstruction to nasal respiration, but the sense of smell was imperfect. Notwithstanding, the patient complained greatly of the odor of her breath. On looking at the neck, a general diffuse swelling was noticed on the right side, and by palpation the growth could not be easily limited. This swelling she said had appeared within the last ten days and was very rapidly becoming worse. An examination of the throat revealed the presence of a large swelling in the region of the right tonsil, and, on palpating with the finger in the mouth, the tumor in the tonsil was found to be continuous with the swelling in the neck. The whole mass was soft and almost fluctuant, its limits could not be clearly made out; the mucous membrane of the soft palate, and the right anterior pillars were deeply injected and much swollen, but there was no ulceration.

June 17, 1889. Since last note was made I have seen the patient every third or fourth day, and during that time the progress of the disease has been very rapid. Now ulceration of the tumor has occurred in the mouth, and, as a consequence, the breath is very fetid, the swallowing of solids has become almost impossible, and she has had to subsist almost entirely on fluid and semi-fluid food. The sense of taste is now entirely gone; also, she has been complaining very much of pain in the right ear, and occasionally small quantities of blood have escaped with the discharges from the mouth, which are now very copious and fetid.

It is not necessary to follow in detail the sad history of this very distressing case, further than to say that the sarcoma in the right tonsil grew rapidly during the summer months of 1889, and gave rise to copious and often-repeated hemorrhages, which greatly reduced the patient's strength. She died of exhaustion, following a hemorrhage, on the 8th of October, 1889—that is to say, five years and three months after the onset of the disease in the left tonsil, which structure was unaffected by the second attack. Therefore, as far as the excision of the left tonsil was concerned, the operation effected a complete cure.

Another case of sarcomatous disease, which came under my notice in 1886, illustrates in a typical form the history and appearance of the tonsil in lympho-sarcoma.

CASE II. *Lympho-sarcoma of the right tonsil, following acute inflammation with suppuration; rapid extension of disease to palate, pharynx, tongue, and lymphatic glands; no operation; death in five months from hemorrhage and exhaustion.*—The patient, J. McM., aged fifty-four years, a merchant, who, when first examined by me, stated that he had been suffering from "a sore-throat" for the last fifteen weeks. The disease commenced with an attack of what was believed by his doctor to be an acute tonsillitis, which, as he at first thought, ended in suppuration. An abscess certainly formed in the tonsil and burst, after which the patient experienced considerable relief. About a month after the first onset of his illness he became aware of the presence of "a lump in his throat," but, on account of the previous inflammatory attack, neither the patient nor his medical attendant attached much importance to the presence of the swelling in the right tonsil until the tumor began to ulcerate. Then the doctor suspected the disease to be specific, and treated it accordingly, although there was no history of the man having contracted syphilis, nor were there any secondary manifestations. When I examined the patient for the first time the following conditions were observed: The soft palate was deeply congested and œdematous; the uvula elongated and pressed to the left side by a smooth, soft, globular, livid mass, the anterior aspect of which was apparently covered by mucous membrane, while its inner and posterior surface was occupied by a fungating ulcer covered by a yellowish gray slough. The tumor was about the size of a golf ball, and was not limited to the right tonsil, but invaded the anterior pillar, part of the soft palate and numerous lymphatic glands.

I was quite satisfied that I was dealing with a soft, rapidly growing sarcoma; but to make the diagnosis certain, I removed a portion of the tumor for microscopic examination, which, unfortunately, proved my suspicions to be correct. No operation was performed; the tumor spread rapidly to the tongue, palate, and pharynx; and the patient died from hemorrhage and exhaustion about five months after the first symptoms were complained of.

These two are the only examples of sarcomatous disease which I have seen, but the following cases of cancer of the tonsil are interesting:

CASE III. *Syphilitic gumma of the right tonsil, extending to the soft palate and wall of the pharynx, with early involvement of the lymphatic glands; slowly amenable to treatment, and followed by development of a carcinoma.*—W. S., a laborer, aged forty-one years, was first seen by me at the Royal Infirmary about the end of January, 1890, when he stated that about nine months ago he first noticed that he had a little difficulty in swallowing, and on looking at his throat he observed that there was a slight swelling on the right side of the throat, but he did not detect any enlarged glands in the neck until November, 1889. When he came to the out-door department, he complained of great difficulty in swallowing, and considerable pain, especially at night. His breath had an extremely fetid odor, and on inquiring into the history of the case I found clear evidence of the man having contracted syphilis six years

previous to the throat affection setting in. On examination, a large gray and red fungating mass was seen occupying the situation of the right tonsil, and extending forward and upward along the anterior pillar to the soft palate. The tumor was very soft and friable, and large parts of it were in a sloughing condition. On examining the neck, several greatly enlarged glands were found. These were hard, firmly fixed, and seemed to be continuous with the tumor in the mouth. In the mouth there was a large quantity of muco-purulent material tinged with blood, but on questioning the patient he informed me that he never had any severe hemorrhages from the growth. He was weak, emaciated, and very anxious regarding his condition. I therefore recommended him to come into the ward, but this he failed to do, and preferred to be treated as an out-patient until the 24th of April, 1890. By this time the tumor had only slightly increased in size, but during the interval considerable portions had sloughed away, some of the pieces being as large as a walnut. Now the tumor was about the size of a goose's egg, and the greater part of it bulged into the mouth and pharynx, and during sleep it caused considerable difficulty in breathing. His voice and articulation were markedly nasal, and there was considerable obstruction in the right nostril. Swallowing was difficult and painful, so that his food required to be almost entirely fluid. The sense of taste was impaired, and generally at night he suffered from severe pain in the right ear.

When the patient was admitted into the ward I examined him repeatedly, and he was also seen by my assistant, D. D. McKellar Dewar. From the appearance of the growth, taken together with the history of the patient, we had considerable doubt as to the nature of the disease. The circumstances (1) that there was clear evidence of the man having contracted syphilis a few years before, (2) that the progress of the disease was slow, (3) that hemorrhage was absent, and (4) that there was a tendency in portions of the growth to separate by sloughing, disposed me to regard the new formation as syphilitic; whereas, on the other hand, (1) the marked dysphagia and severe pain radiating from the throat to the ear, (2) the marked involvement of the lymphatic glands, (3) the emaciation and anæmia, which were altogether out of proportion to the diminution of the quantity of food taken, led me to suspect the disease to be malignant. At first the patient was treated by giving him green iodide of mercury and extract of opium in pills, while the mouth was sprayed with a solution of perchloride of mercury after the use of an alkaline gargle. This course of treatment was followed by the administration of iodide of potassium in the usual way; but when the patient left the ward at his own request on the 30th of May, it was noted: "Since admission the growth has remained practically the same size, even although large portions have separated spontaneously or in sloughs. Under treatment by iodide of potassium the tumor ceased to grow rapidly, but it cannot be said that there was any actual diminution in its bulk." Portions of the growth which came away spontaneously or were removed by forceps presented the microscopic characters of a gumma. Therefore, when the patient was dismissed, he was directed to continue the anti-syphilitic treatment, and to come to the out-door department regularly, which he did. During the summer of 1890 the condition of the throat improved very much, and for some time I had a hope that a cure might be effected. The slow response to treatment, however, rendered the diagnosis doubtful.

During the autumn of 1890 the patient was seen occasionally at the out-door department, and until November of that year he considerably improved; but even at the best there was a marked swelling on the right side of the neck, and very distinct enlargement of the right tonsil with ulceration of its surface. From the beginning of November till the 13th of February, 1891, the patient was not seen, and when he returned his condition appeared to be so much worse, that I recommended him to come again into the ward. The ulcerated area was now greatly increased in size, but the tendency of portions of the tumor to separate by sloughing was not so marked as formerly. The patient now complained of great difficulty in swallowing, and he suffered very much from pain at all times. The growth seemed to be harder than in November, 1890, and the lymphatic glands were involved to a greater extent. In order to relieve the dysphagia a large portion of the tumor was removed and subsequently submitted to microscopic inspection, when it was found at some parts, but not at all, to present the characters of an acute carcinoma. The patient was kept in the ward for a month; during that time no improvement took place. On account of the malignant character and the extent to which the disease had spread, no radical operation could be advised; the patient was therefore dismissed, palliative treatment being prescribed.

Case IV. *Primary epithelioma of the right tonsil; rapid and extensive involvement of lymphatic glands; no operation.*—H. W., an engineer, aged forty years, came to the out-door department of the Royal Infirmary for the first time at the beginning of October, 1890. The patient was unable to say when he began to be troubled with his throat, but he was certain that in the previous July it was quite well. What he complained of most was pain in the right ear, and at the angle of the lower jaw on the same side; he also experienced considerable difficulty in opening his mouth, and thought "that his jaw was becoming fixed," which he considered to be due to a hard swelling under the jaw. This swelling, he said, had been growing very rapidly of late, while at the same time the pain had become more intense, and was always worst at night. When examined by me for the first time, on palpating the right side of the neck, I found a large, diffuse, irregular, and firmly fixed tumor immediately below the angle of the lower jaw, and on passing the finger into the mouth, the tumor in the neck was found to be continuous with a growth in the right tonsil. The whole mass was as large as half a cricket ball. On further questioning the patient, the fact was clearly made out that the enlargement of the tonsil occurred fully two months before he noticed any swelling in the neck. Indeed, the involvement of the lymphatic glands was apparent to the patient for the first time at the beginning of September. On examining the mouth a large and not very well defined tumor was found to occupy the place of the right tonsil. The great bulk of the tumor was covered by congested, but otherwise uninjured, mucous membrane; and at its anterior part, corresponding to the situation of the anterior pillar, there was a deep, irregular excavated ulcer, covered by a grayish slough. There was no history of syphilis. From the history of the case and the appearance of the tumor I was satisfied that the tumor was an epithelioma. The patient was therefore advised to come into the ward, in order that a more complete examination might be made, and, if considered advisable, an operation be performed. On admission to the ward a small

part of the tumor was removed for microscopic examination, when it was proved to be an epithelioma; but considering the wide area involved in the tumor, its very rapid growth, and the weak and anæmic condition of the patient, I did not consider it my duty to do more than fully state the whole circumstances of the case to the man himself, and he, I think wisely, determined not to have an operation performed. In this case I felt that the immediate dangers of the operation were very considerable, while the prospects of prolonging life or alleviating suffering were not great.

CASE V. *Epithelioma of the left tonsil; rapid growth and speedy involvement of lymphatic glands; dysphagia, severe pain, anæmia, and death from exhaustion three months after onset of disease.*—Mrs. B., housewife, aged forty-seven years, was admitted to the Glasgow Royal Infirmary on the 23d of December, 1889, in an extremely weak and emaciated condition. So reduced was her strength that I found some difficulty in procuring a history of her illness. From what she told us it appeared that only three months previously had she noticed anything wrong with her throat, and for a fortnight this only amounted to a difficulty in swallowing; but soon afterward pain, at first slight, but subsequently severe, troubled her, especially at night. The pain extended from the larynx to the left ear, was always present more or less, but as a rule was not so bad in the morning. Beyond the pain, dysphagia, and general weakness, she complained of nothing. On examining the throat a large epithelioma was found, involving the left tonsil and extending downward to the epiglottis and leading to secondary formations in the cervical lymphatic glands. Those at the angle of the jaw were incorporated in the tumor, and altogether formed a mass the size of a large apple. Viewed from within the mouth the tumor was seen as a large fungating and sloughing growth, the surface of which was covered by a muco-purulent and extremely fetid discharge. On palpation it was found to be hard, firm, and nodulated; and on microscopic section it presented the character of an epithelioma. At the level of the cricoid cartilage there was a small gland, which was hard, but not fixed to the skin, nor to the underlying structures, over which it moved freely. Cancerous cachexia was well marked, the pulse very weak and small. The patient died from exhaustion six days after admission.

CASE VI. *Epithelioma of right tonsil, spreading to soft palate within six weeks, and to gland within eight weeks; favorable for operation within first three months, but refused by patient; death from hemorrhage and exhaustion six months after onset of disease.*—D. McW., aged sixty-one years, a shoemaker, a man of intemperate habits, but who enjoyed unvarying good health until three months previous to admission to the Glasgow Royal Infirmary, on the 27th of June, 1888. About the beginning of April of that year he first experienced some discomfort in swallowing, and when he looked at his throat in a mirror he noticed a swelling of the right tonsil, but considering it to be of no importance, he did not seek medical advice until the 15th of June, 1888, when he consulted me. He then gave the following history of his illness: At the end of the first week of April he thought that a bone had stuck in his right tonsil, and, trying to remove it with his finger-nail, he caused some bleeding, but did not succeed in finding a bone. At this time the tonsil was not much enlarged, but during April and May considerable increase in its bulk occurred, so that by the end of the latter month it was "the size of a

large walnut," according to the patient's statement, and the tumor had begun to grow over the soft palate. On the 17th of May there was a moderately profuse hemorrhage (twelve ounces) from the tumor, and from that date until the 15th of June bleeding occurred almost daily, but was seldom more than two or three ounces at a time. Pain also set in about the beginning of May, and increased in severity and duration along with the enlargement of the tumor. On the 5th of June the patient noticed for the first time a distinct and separate swelling at the angle of the lower jaw, and he said that as this swelling increased, the pain in the throat and ear diminished in severity. When examined by me at his own home I found him pale, but not emaciated. A man of 5 feet 9 inches, he weighed 10 stones, 11 pounds, but when in perfect health his weight was 11 stones, 12 pounds. Considering his condition, his general health appeared good. The voice was nasal in quality, but there was little or no impediment to breathing by the mouth, although the mobility of the tongue was impaired by the enlarged tonsil. On examining the throat an ulcer about the size of a penny, round in form, and with everted edges, was found to occupy the upper portion of the right tonsil and the neighboring part of the soft palate. The ulcer was about equally distributed on each of these parts. The surface of the ulcer and its edges presented a fungating appearance, while the surrounding mucous membrane was hyperæmic and œdematous, and covered from time to time by a very fetid muco-purulent discharge. At no time were sloughs seen to separate, nor did the patient admit having had syphilis, but considering the life he led, his statements on this point could not be thoroughly depended upon. While removing a portion of the tumor for microscopic examination, I at the same time placed the patient on an anti-syphilitic treatment, but without any benefit being derived from it. The portion of growth removed on the first occasion showed nothing more than an aggregation of recently formed inflammatory connective tissue. After the patient had been admitted to the Royal Infirmary, namely, on the 29th of June, another specimen was taken away with cutting forceps, and on examination it presented the structure of an epithelioma.

Considering all the circumstances of the case, the general good health of the patient, the absence of emaciation and cachexia, the comparatively small size of the tumor, and the slight involvement of the lymphatic glands, I felt it right to recommend the patient to have an operation performed. This he at once consented to, but his relatives, on learning what was to be done, persuaded him to leave the hospital, and I have seen no more of him. I was informed, however, that he died about the end of September from hemorrhage and exhaustion.

Case VII. *Epithelioma of tonsil and soft palate in a patient who suffered years previously from syphilitic ulceration of throat; moderately rapid advancement of tumor, and early involvement of lymphatic glands; no operation.*—C. D., aged sixty years, dock laborer, was admitted into the Glasgow Royal Infirmary on the 26th of September, 1889, complaining of difficulty in swallowing, and obstruction to the left nostril. He said that both his throat and nose troubled him very much, but that the "first thing that put him about" was the feeling as if "something

had stuck in his throat." He said that he felt as if "a boy's marble was fixed at the back of his tongue," on the left side. There was also a feeling of "stiffness" on the left side of the throat, but soon afterward he experienced pain in the left ear and down the neck as far as the sternum. At this time (May, 1889) there was no difficulty in swallowing, but he suffered very much from a continual discharge of saliva and mucus from the mouth. He began to experience pain of a severe character only two months previous to admission. It was not limited to the throat but extended to the left ear and to the left side of the thorax; he, however, believed the pain in the latter situation to be due to an injury he received some months previously. On admission the patient was feeble, and there was very marked anæmia. Examination of the throat showed the soft palate to be marked by an old and deep cicatrix, and on the posterior wall of the pharynx there were marked contractions due to healed syphilitic ulcerations. In the left tonsil, and on the neighboring part of the soft palate, there was a deep ulcer with a small sinus, which passes into but not through the soft palate. There was great enlargement of the tonsil, and marked thickening of the soft palate; the mucous membrane was hyperæmic and the whole of the throat was covered by a white, very fetid, muco-purulent discharge. There was marked enlargement of the lymphatic glands in the neck. The history of the case and the presence of old syphilitic cicatrices led me to suspect the disease of the tonsil to be also syphilitic, but the appearance of the tumor resembled epithelioma so strongly that I removed portions of it for microscopic examination, when it was shown to be an epithelioma. Previous to admission the patient was treated for syphilis without any improvement taking place. The case was not a suitable one for operation.

Case VIII. *Epithelioma of left tonsil and left posterior pillar and uvula; no involvement of lymphatic glands; early diagnosis; complete removal by operation; no recurrence nineteen months after operation.*—Mr. A., aged sixty-five years, a farmer from Wigtonshire, consulted me in June, 1890, when he told me that for the last four weeks he had been suffering from a swelling in his throat, and pain in the left ear. I had seen him two years before on account of a simple but somewhat chronic attack of tonsillitis, from which he had completely recovered. On examining the tumor in the throat I found it to involve the upper part of the left tonsil, where it originated, as well as the posterior pillar and the left side of the uvula. From the appearance of the growth I at once concluded that it was an epithelioma, but to make the diagnosis certain I immediately removed a portion for microscopic examination, and the day following I completely excised the tumor, and with it a good part of the healthy tissue surrounding. I shall refer to the method of operating further on. The patient made a good recovery, and no recurrence has taken place till the present (January, 1892).

Case IX. *Epithelioma of right tonsil of small size; operation advised but refused by patient; slow extension of tumor to gum and glands; severe hemorrhages; death eighteen months after onset of disease.*—Mr. S., aged seventy years, was recommended to consult me by Dr. R. S. Stevenson, of Innellan, who kindly furnished me with the following report of the case: "The patient consulted me March, 1889, when he complained of sore-throat and difficulty in swallowing. On examination a small, round ulcer, an eighth of an inch in diameter, was plainly seen on the right tonsil. The edges were prominent and the surface covered with an

adherent slough, the tonsil itself being slightly enlarged and congested. At this time the glands of the neck were not enlarged. His previous health was good, and there was no history or evidence of syphilis. In June of the same year the question of operating was discussed, and Dr. David Newman's opinion was asked, but even although he strongly advised the removal of the tumor, the patient would not consent. The pain gradually increased, and by the end of summer was constant and very severe in the occipital and temporal regions. Locally the disease gradually spread, involving the whole tonsil, and by January, 1890, the lower jaw was implicated. In March there was a very severe bleeding, which lasted for six hours and only ceased with the continued application of ice. After the hemorrhage the pain in the head and in the mouth disappeared for fully a month, and when it did return was less severe than formerly. Swallowing also was easier. At the time of death (September, 1890) both the upper and lower jaws were involved as well as the cheek, but there appeared to be no tendency to spreading in a downward direction." When I saw Mr. S. for the first time I removed a small portion of the tumor for microscopic examination, which proved it to be a typical epithelioma. With the exception of the man's age all the circumstances were in favor of an operation, and I therefore advised removal of the tumor, but the patient and his relatives would not hear of it. This was probably the most suitable case for operating that I have seen.

CASE X. *Epithelioma of the tonsil and soft palate.*—Mrs. L., aged fifty-one years, was admitted into the Glasgow Royal Infirmary on the 20th of December, 1891, suffering from an epithelioma of the left tonsil and soft palate. The history of the case showed that fifteen weeks previous to admission the patient for the first time noticed that she had a difficulty in swallowing, which soon became very painful, especially on taking hot food. She tried to treat herself for some time, but ultimately had to consult her doctor, who, on account of the acute inflammation and the formation of a kind of membrane, suspected the disease to be diphtheria, but did not pronounce an opinion as to its nature. On admission the patient appeared fairly healthy, but stated that during the last three months she had been losing flesh and weight. She complained of little or no pain in the throat unless when swallowing, but great pain at times in the left ear. This pain never affected her until after the throat symptoms had developed themselves.

An examination of the throat showed the left tonsil to be swollen and ulcerated. The ulcer extends from the tonsil to the anterior pillar, and to the margin of the soft palate and uvula. There is not much enlargement of the tonsil nor are the lymphatic glands involved, but a section of the growth shows it to be an epithelioma.

December 26, 1891. My assistant, D. D. McK. Dewar, performed tracheotomy to-day, after injecting cocaine subcutaneously, preliminary to my removing the tonsil.

I now desire to make a few remarks regarding the pathology, etiology, and diagnosis of malignant disease; after which, treatment, operative as well as palliative, will be discussed.

In many of the recorded cases of cancer of the tonsil the surgeon has failed to state the variety of the disease he had to deal with. It is

therefore difficult to state exactly the relative frequency in which epithelioma, encephaloid, and scirrhous cancer occur, but even although the distinctions alluded to have not been made, the descriptions of their clinical history of the cases and of the anatomical character of the tumors have been in many instances sufficiently well marked to warrant me in forming a conclusion respecting the true nature of the lesion. In a few instances it has been found impossible to form an exact diagnosis.

The greatest confusion has existed in malignant disease as it attacks the tonsil, just as in other parts of the body, in the diagnosis between encephaloid cancers and round-celled sarcomata. In consequence encephaloid cancer has been regarded as common. In both encephaloid cancer and in round-celled sarcoma the disease extends rapidly, the neighboring lymphatic glands become involved early in the progress of the disease, and such adjacent structures as the pillars of the fauces, the palate, the pharynx, the root of the tongue, or the gums, are speedily encroached upon. As a result the tumor projects into the mouth, deglutition and speech become painful and difficult, and respiration is impeded even to impending suffocation. The mouth comes to be occupied by decomposing and sloughing masses of the tumor, the breath is fetid, and acrid irritating and offensive discharges trickle from the mouth; hemorrhages are frequent and occasionally copious, and death speedily results from bleeding, exhaustion, suffocation, or septic poisoning, or a combination of these causes. In acute carcinoma, early in the course of the disease, sloughs separate and deep, foul cavities form, whereas in sarcoma, unless perhaps in the most acute variety, the tumor maintains for a shorter or longer time a consistent form, its surface for the time being is smooth and unbroken, but when the capsule is ruptured and ulceration does occur, the tumor-formation spreads with marvellous rapidity, and penetrates and infiltrates by continuity the neighboring parts. It does not spread so much by the lymphatic channels as by immediate contact.

With regard to malignant disease of the tonsil Mr. Butlin[1] remarks:

> No matter what the variety of the disease, it runs a peculiarly rapid course to death, affecting the lymphatic glands at a very early period, and producing large and widespread tumors in the neck. This circumstance, so fatal to all attempts to cure by operation, may be explained by the very intimate relation which exists between the tonsil and the cervical lymphatic glands, even the ordinary chronic enlargement of the cervical glands; it is, therefore, not to be wondered at that carcinomas, which affect the glands at an early period in other parts of the body, have a still greater tendency to do so when they originate in parts which are so closely connected with the glands as are the tonsils. And when the peculiar character of the primary sarcomas of the tonsil, their similarity to the structure of the organ whether in health or in disease, is taken into account, it must be admitted that the absence of glandular affection in connection with primary sarcoma of the

[1] The Operative Surgery of Malignant Disease, London, 1887, p. 173.

tonsil would be more remarkable than its occurrence. So early in the course of the disease are the glands affected that they may appear as large swellings in the neck within a few weeks of the period at which the first signs of disease were noticed by the patient. On the other hand, there may be no visible or tangible glandular enlargement until six or more months have elapsed from the first occurrence of enlargement of the tonsil.

I quite admit the truth of these remarks, but in addition would like to point out that some sarcomatous tumors, such, for example, as the spindle-celled sarcoma, may remain limited within their capsule and therefore be capable of complete removal, as in my first case.

I may now exclude cases of acute carcinoma and round-celled sarcoma, and consider the other varieties of malignant disease of the tonsil, namely: epithelioma, scirrhus, spindle-celled sarcoma, or fibro-sarcoma, and adeno-sarcoma. Only a very few words are required for each variety. To the acute forms of malignant disease which I have just described, epithelioma is next in order of frequency. If you were to form an opinion from statistics previously collected, you would be inclined to believe that this was a rare variety of cancer, whereas, as a matter of fact, out of ninety-two cases of carcinomatous disease which I have collected I find true epithelioma in twenty-four.

In the same collection of cases scirrhous cancer has presented itself seven times; indeed, it may be regarded as one of the rare affections of the tonsil. Fibro-sarcoma and adeno-sarcoma are still less frequently met with. Barker and Scheurlen have recorded cases which may be placed in the former category, and Gray has published the only example I have found of adeno-sarcoma of the tonsil.

We now come to consider the question of treatments. In very few forms of malignant disease has operative treatment been less successful than in those instances in which the tonsil has been primarily attacked. The reason for this is not far to seek. Anyone who has carefully investigated the literature of the subject must have recognized the facts that on the one hand the disease becomes rapidly disseminated, and consequently the patient is placed beyond the curative power of the surgeon; while, on the other hand, the general practitioner who has, in most instances, had the first care of the case, has failed to recognize its nature. This is not to be wondered at, when it is remembered that most writers have taught and still teach that malignant disease of the tonsil is rare, and therefore not to be looked for; so that many of the cases have been mistaken for inflammatory or syphilitic affections, and being treated as such for a shorter or longer period, the disease has been permitted to involve the structures surrounding the tonsil, and especially the lymphatic glands. If the surgeon desires to finally stop the growth of the tumor and not simply to interrupt its progress for a time, he must have the case brought under his care at an early stage, and it must

be his endeavor to remove the tonsil and surrounding structures very freely.

The cases which present themselves may be artificially divided into two classes: first, those in which operative intervention is justifiable either with the object of eradicating or of staying the progress of the disease; and second, those instances in which palliative remedies can alone be recommended. I will immediately discuss the various methods of operating, and then proceed to consider the other palliative means which we have at our disposal of relieving the suffering of the patient and of prolonging life. These latter include the relief of pain, dyspnœa, dysphagia, and hemorrhage.

Two distinct methods of operating have been practised; first, removal or destruction of the tumor through the mouth, and the excision of the growth and of its surroundings by an external incision. Each of the methods has been variously modified according to the individual requirements of the case. Vogel published a case, in which he operated with apparent success upon a patient, previous to 1780, but from that time till 1836, when Velpeau extirpated the tonsil of a man aged sixty-eight years, no cases have been recorded. The patient was admitted to hospital suffering from a large ulcerating tumor which completely filled the pharynx, and also blocked the nostrils, so as to threaten death from suffocation. Velpeau deemed it advisable in order to control hemorrhage, should it prove severe, to cut down upon the carotid artery. He there placed a ligature round it to to be tied if required. This precautionary measure having been adopted, he then introduced through the mouth a sharp hook with which he dragged the tumor forward and to the middle line, while at the same time, by means of a short knife, he divided the soft palate, and dissected out the mass of the tumor. Subsequently, by means of an external incision, he extirpated some lymphatic glands. The patient died from prostration and septic poisoning on the eighteenth day after the operation, and at the *post-mortem* examination the primary growth was found to be completely removed, and no secondary formations were discovered.

Again, in 1846, M. Feno states that M. Roux[1] ([78]) removed a soft carcinomatous tumor from the tonsil of a woman, aged forty years, by the mouth; and also by an external incision behind the jaw he excised an affected gland which was involved in the disease. Mr. Lawrence ([67]), in his lectures on Surgery,[2] describes the following case:

> A man of about forty-five years of age, who had always enjoyed good health, his occupation through life having been agricultural, came into St. Bartholomew's under my care, for an enlargement of the right tonsil, presenting the usual character of hypertrophy, and obviously requiring excision,

[1] For references, see Bibliography at the end of this paper.

[2] Lectures on Surgery, p. 611. 1863.

an operation which I had never performed except on much younger subjects. The only complaint was of some difficulty in swallowing, apparently dependent on the enlargement. This was rather beyond the bulk that could be passed into the opening of the so-called guillotine, usually employed in the operation. I therefore cut off as much as protruded, with the effect of remedying completely what had been complained of. The part removed was simply hypertrophied tonsil. He returned to the country, with a strict injunction to come back if any further inconvenience should be experienced. He came to the hospital again in the month of October with a swelling as large as an egg, proceeding from the former site, and seeming to fill the pharynx, so as to produce a formidable impediment to the act of swallowing. This I removed with the écraseur, getting the loop of the chain over the lower end of the swelling, which was at some distance below the tongue, drawing up the ends, so as to include the root of the mass, and then fixing them to the movable branches of the instrument, the action of which caused so much choking feeling and involuntary efforts of the surrounding parts, that it was necessary to hasten the process, which was accomplished almost without loss of blood. The part removed appeared as an entire tonsil, simply enlarged by hypertrophy, with slight surrounding covering of cellular tissue in a perfectly natural state. The section presented a substance of very light brown tint, similar to that of the natural gland and in a lobular arrangement. Mr. Savory reported that a most careful microscopical examination detected nothing but gland elements. This patient came once more to the hospital in July of the present year, with a swelling apparently glandular, larger than my fist, under the right sterno-mastoideus, of firm but not scirrhous hardness, and covering closely all the important structures at the side of the neck up to the angle of the jaw. It was not painful, and had not been so during its increase, which had been rather rapid.

Mr. Lawrence regarded this case as one of malignant disease.

Between 1860 and 1870 cases were operated upon by Erichsen ([57]), Warren ([88]), Houel ([66]), and Langenbeck ([18]), the last-mentioned surgeon being, according to Hueter, the first to operate by an external incision, in the year 1865.

Previous to the publication of Langenbeck's and Hueter's cases, Professor D. W. Cheever reported in an American medical journal,[1] in 1888, a case operated on by him.

Having given this very brief historical sketch of the operations for removal of the tonsil in malignant disease, I shall now proceed to consider in detail the various methods employed.

Tracheotomy having been performed a week previously, an anæsthetic is administered through the tube, and when the patient is completely under its influence the larynx should be plugged with sponge so as to prevent the possibility of any blood passing into the trachea. The surgeon has then to select his method of operating. In many instances no preliminary tracheotomy has been performed, but the risks of that operation are very slight and the advantages considerable.

A. Removal of the tumor through the mouth:

1. By chemical caustics and escharotics.
2. By the tonsillotome or curette.

[1] Boston Medical and Surgical Journal, p. 54, 1869.

3. By ligature.
4. By écraseur.
5. By electric cautery and écraseur, and thermo-cautery.
6. By electrolysis.
7. By incision:
   a. Without tracheotomy.
   b. With tracheotomy.

B. By external incision:
   a. Without tracheotomy.
   b. With tracheotomy.

A. 1. Removal by chemical caustics and escharotics has been practised in a considerable number of cases which have been published ultimately as examples of malignant disease; but fortunately for the credit of the profession, this treatment has not been applied at a stage when the nature of the disease could be easily recognized. But whenever employed for the treatment of malignant tumors the effect of the chemical agents has been evil rather than good. The only surgeon who seriously recommended the use of caustic for the treatment of malignant disease of the tonsils was Maisonneuve ([73]), who suggested *cauterisation en flèches* as a means of removing a cancer of the tonsil. This was, however, in the year 1859, at a time when powerful caustics were employed for the destruction of cancers; but notwithstanding the feeling of the time in respect to this method of treatment, the members of the Société de Chirurgie de Paris, before whom his paper was read, almost unanimously disapproved of this mode of treatment.

2. Excision by the guillotine, the tonsillotome, or the curette, has also been employed by some surgeons, but on inquiring carefully into the history of these cases it will be found that in those instances in which one or other of these methods of removal was employed the serious nature of the disease from which the patient was suffering was either not appreciated at the time, or portions of the growth were removed for diagnostic purposes only.

3 and 4. The fear of hemorrhage during an operation has induced a few surgeons to adopt the use of the ligature as a means of cutting off the blood-supply, and so causing the growth to slough away. But even those who have employed this method condemn it as useless; and but little better success has attended the use of the écraseur, as employed by Lawrence ([67]), Demarquay ([31]), Thomas ([31]), and Erichsen ([57]). In all these cases a very temporary advantage was derived from removing only a portion of the bulky mass which protruded into the mouth and pharynx. As pointed out by Poland[1] ([76]), removal of malignant disease by the écraseur may be undertaken when the tumor has not attained any large size, and when the loop of the instrument can readily embrace the

[1] British and Foreign Med.-Chir. Rev., p. 490.

whole base of the tumor; but danger is attached to this operation at all times, as the loop may include some of the important vital structures in the neighborhood—viz., the internal carotid, jugular vein, and pneumogastric nerve. To obviate this, Demarquay (51) had recourse to Blandin's (40) procedure of a temporary incision in the neck so as to lay bare the structures he wished to avoid, and having them held aside by an assistant, then introducing the finger and conducting the loop of the écraseur over the tumor from within the mouth; he thus, so far, kept all the important vessels and nerves from the grasp of the loop. His description of the operation is as follows:

"The case was one of ulcerating cancer of the tonsil, palate, and advancing on the base of the tongue; there was no glandular enlargement, and iodide of potassium had failed. Having carefully ascertained the extent of the disease, I thought I could remove the whole with the linear écraseur; but in order to avoid comprising within the loop of the écraseur any important structure, I made an incision four fingers' breadth along the course of the internal border of the sterno-mastoid. I reached easily the vessels and nerves in contact with the tonsils, and separated them; having done this, I proceeded slowly to remove the tumor with the chain of the écraseur; and having first made an oblique incision through the velum palati to the right of the uvula, and then carefully using Chassaignac's instrument, I seized the tonsil with hook-forceps and drew it forward to the side of the mouth, and threw the chain around the mass comprising the tonsil, pillars, and a large piece of the right portion of the velum. During the proceeding with the écraseur, I took care that it did not pass beyond the prescribed limits. There was no hemorrhage. I removed afterward with the curved scissors a portion of the tongue in relation with the tonsil, as also some hypertrophied glands. I closed the preliminary incision, which united in a few days. The conditions inside the mouth proceeded satisfactorily, although he had spitting of blood for forty-eight hours, which ceased under the use of ice. The operation entirely succeeded; his health was restored, and he became stout. However, a return may take place."

By thus making a preliminary incision, he not only secured the carotid from injury, but was enabled to ascertain that the cancer had not extended along the pharynx.

5. Within recent years the thermo-cautery and the galvano-cautery have been largely employed in general surgery, and also in attempts to remove tonsils the seat of malignant disease. Tumors of this kind have been removed *per vias naturales* in several cases, as recorded by Gorecki (12), Wolfenden (36), Brown (42), Cozzolino (7), Bruce (43), and Donaldson (54).

A preliminary tracheotomy may be performed, as was done by myself (in Case I.), or, in order to get more complete access to the diseased parts, an external incision may be made previous to removal by the cautery. This latter method was adopted by Barker (2) and Franks (61). Mr. A. E. Barker[1] describes his operation as follows:

An incision was first made along the anterior border of the sterno-mastoid muscle over the gland, and it was carefully shelled out of its bed, which lay upon the great vessels of the neck. Having purposely exposed the latter, I

[1] Trans. Path. Soc. Lond., vol xxxvii. p. 219.

felt less hesitation in attacking the diseased tonsil, as bleeding could be easily controlled if severe. Leaving a carbolized sponge in the cervical wound for the present, I made a vertical incision through the anterior pillar of the fauces with Paquelin's cautery knife, and through this was able with blunt instruments to enucleate the diseased tonsil with comparative ease, and without in the least breaking into the mass. As this was all done by blunt dissection, only a drachm or two of blood was lost. I then removed a small nodule of growth seated at the opposite side of the base of the tongue. This was the size of a nut, and was quite distinct from the tonsillar growth; it had not been detected before. The resulting wounds were dusted with iodoform, and that in the neck was sutured. Both healed quickly without any reaction, and the patient made a rapid recovery. In May (three months after the operation) the disease was found to be advancing rapidly in the glands, and on July 14th the patient died without having any throat symptoms.

In my Case VIII. the operation was performed with the galvano-cautery, as follows:

A twenty per cent. solution of cocaine was placed in a hypodermatic syringe, and along the line of the intended incision, at distances of a quarter of an inch, one drop of the solution was injected. The patient was seated on a chair, and after five minutes he was asked to open his mouth, and with the cautery at a white heat I rapidly cut out the tumor and a considerable part of the surrounding healthy tissue. The patient did not suffer any pain to complain of; there was absolutely no bleeding, and the tumor, which was an epithelioma, had not recurred nineteen months after the operation.

6. The treatment of sarcoma of the tonsil by electrolysis has been as unsuccessful as the treatment of malignant disease by other incomplete methods. This mode of removing a diseased tonsil has been employed by Holger Mygind, of Copenhagen ([26]), but with poor success. As a warning to others who think much of electrolysis, I will quote Mygind's words as reported:

"The treatment with electrolysis was commenced on February 10th, and continued until March 12th, during which time the patient underwent eighteen séances, each lasting about twenty minutes. As a rule, the electricity was applied four or five days running, with intervals of three or four days. The current was produced by means of the galvanic battery recommended by Apostoli, of Paris, for gynecological operations; besides this, a rheostat and a rheometer were always used. The strength of the current varied from eight to twelve milliampères, beyond which strength the application caused pain. In the first seven séances the positive electrode was applied externally on the neck and the right side of the head (not including the external ear), in the form of a large fenestrated soft plate of zinc covered with moistened gauze. Later, both electrodes were applied to the growth in the form of gold needles, of which never more than two were connected with each pole. Whilst the needles connected with the positive pole always remained fixed in the growth, when first applied the negative needle had to be fixed by means of a long holder fitted to the patient's forehead, on account of its inclination to slip out. The needles were all applied so that only the peripheral part of the tumor was destroyed.

The electrolytic treatment transformed the growth by degrees to a grayish, necrotic mass in its peripheral parts, so that it was at last possible to separate the whole original tumor by means of a slight cut with a knife through the uvula, which meanwhile had become involved in the growth. There was not the least bad smell produced by the process, nor any other

sign of putrefaction, and no purulent matter whatever was observed. The temperature, taken every day, never rose above 99°, excepting once, when it reached 100.2°. The pulse was never beyond 60 (Mr. M. was a tall man). The malignant tumor, however, pursued its rapid growth, which the destruction by electrolysis was unable to keep up with, and the increasing debility of the patient soon prevented further active treatment. The patient lost about nine pounds in weight during the electrolytic treatment, but was nearly all the time able to attend to his business (office clerk). Deglutition was not rendered more painful, and the pain in the throat and ear was considerably less during the latter part of this period, probably owing to the diminished tension in the growth, caused by its destruction. During this time the patient took 15 grains of iodide of potassium three times daily. The last period of the disease lasted from March 13th until April 26th, when death occurred.

7. The removal of malignant disease by incision through the mouth was, as far as I am aware, first performed by Velpeau ([86]), and was subsequently described by Warren ([88]), as a bloody and dangerous operation, requiring for the suppression of hemorrhage the employment of the actual cautery, or ligature of the carotid. Hence, you see, the objection to incision of the diseased tonsil with a knife or sharp instrument, is that severe hemorrhage is likely to follow, unless in cases of sarcoma, where the growth is encapsulated, under which circumstances it may be shelled out, after a preliminary incision. The finger may be used in preference to any instrument, and by completely dissecting the growth with the finger-nail more complete enucleation may be effected than by other means. When the knife is to be employed, the question suggests itself to the surgeon, Am I to remove the tumor by an incision through the mouth, by an external incision, or by a combination of these methods? If the growth is limited in size, and the glands are uninvolved, the first-mentioned operation may be sufficient. The mouth of the patient should be held wide open by a suitable gag, while his head is allowed to hang well over the operating-table. The surgeon then seats himself at the patient's head, so that as he views the mouth the palate is lowermost and furthest away, while the tongue is uppermost and nearest the operator. By adopting this method any blood that escapes flows from the mouth at once, or may be washed out with a douche. (This method I employed first in Case I.) The mouth should be well illuminated with an electric forehead lamp, and the tumor removed by whatever means the surgeon considers most desirable for the individual case. The most common method is to seize the growth with a sharp hook or forceps, and then with a knife rounded at the point the tumor is carefully cut out, small incisions being made at each stroke, and bleeding-points tied or compressed as they appear. If necessary, the cautery may be applied.

Again, in cases where the lymphatic glands have become involved they may require to be removed by an external incision, or if the disease has extended beyond the tonsil and come to involve such structures

as the pillars of the fauces, the arch or margin of the palate, or the base of the tongue, a more extensive operation than the one just described may be required.

B. Operations by external incision have now been practised in a considerable number of cases. As far as I can learn, Langenbeck ([18]) was the first surgeon to use this mode of operating, in the year 1865, and the result was successful; hence, since that time, most surgeons have shown a preference to remove the tumor by pharyngotomy rather than through the mouth. The reason for this is obviously that the external incision gives the surgeon more complete control over hemorrhage, enables him to remove the tumor more completely, and gives him more room. The method adopted by Cheever[1] is described as follows:

> The tumor was removed by external incision, the myo-hyoid muscle divided, the lower jaw sawn through in front of the masseter, and the tumor pressed out of the mouth. It was covered with a delicate capsule, and exuded soft material on puncture. It was removed without much difficulty along with the capsule. The facial artery and jugular vein were the only vessels tied, and there was no hemorrhage. The wound in the pharynx was not sutured, the jaw was wired, the external wound brought together partially and washed with a two per cent. boric acid solution. On the thirtieth day the wires were removed, the jaws being firmly united. On April 27th a second operation was performed for a tumor on the same side of the neck, and a large glandular mass was removed from the anterior carotid triangle. The throat remains healthy (May 15, 1889). The tumors proved microscopically to be round-celled sarcoma.

In order to obviate the danger of blood passing into the trachea, and to facilitate the administration of the anæsthetic, it is now thought proper to perform a preliminary tracheotomy. By doing so the surgeon is free to perform a more complete operation. Czerny was the first to adopt this method. He cut down upon the lower jaw, which he divided between the second and third molar teeth. By separating the fragments the tumor was exposed and removed, and bleeding-points secured or cauterized.

In this operation it may be necessary to divide the gustatory, the hypoglossal, and the glosso-pharyngeal nerves, the stylo-hyoid, the digastric, and the stylo-glossus muscles, as also the lingual and some branches of the facial artery. The wound should then be washed out thoroughly with an antiseptic solution, the bone united with strong silver-wire sutures or by pegs, a drainage-tube inserted, and the wounds in the mucous membrane and skin sutured with two separate sets of stitches.

Another mode of operating was adopted by Mikulicz ([74]) and Kuster. The advantages claimed for it are: that the lymphatic glands can be very freely removed, that blood escapes externally and not into the mouth, and that the wound can be dressed aseptically so long as the

[1] Medical Record, May 25, 1889.

disease does not involve parts in the mouth beyond the tonsil. The endeavor is to remove the tonsil and affected glands without cutting through the mucous membrane of the mouth; it is, therefore, obvious that the operation can only be used for the removal of encysted tumors, such as sarcomata. In cases where ulceration has occurred it is inapplicable. By making an incision downward and forward from the mastoid process of the temporal bone to the greater corner of the hyoid, in a line midway between that of the stylo-hyoid and stylo-pharyngeus muscles, the soft parts are raised from the inferior maxillary bone. The jaw is then divided, and the ramus separated from the temporal muscle, so as to permit the bone to be drawn to one side. The masseter, the internal pterygoid, the digastric, and the stylo-hyoid muscles are then divided, and if care is not taken important branches of the portio dura of the seventh nerve may be injured. By this incision the tonsil is exposed, and also the lymphatic glands at the angle of the jaw, which are so frequently involved.

Before leaving the question of operation a few words are required regarding the results of surgical interference: first, as regards the possibility of cure; and, second, as a palliative measure.

Of the 144 cases of malignant disease of the tonsil which I have collected, in only 56 was an operation attempted. In the remaining instances, as in the majority of my own cases, the disease was too far advanced to encourage the surgeon to operate.

With respect to the incomplete methods of removing the diseased tonsil, such as the application of chemical caustics, removed by the écraseur, ligature, tonsillotome, curette, or by electrolysis, they require only to be mentioned to be condemned as not holding out the least prospect of cure. Therefore, the only question worth consideration is the relative merit of removal through the mouth or by external incision.

As in cases of malignant diseases of the nasal fossæ, so also in those diseases as they attack the tonsil, in the early stage, from naked-eye observation alone it is almost impossible to say whether the disease is carcinomatous or sarcomatous. In some instances it is even difficult to pronounce the disease to be a tumor-formation. Cases are on record where malignant disease has been mistaken for a syphilitic affection, for abscess of the tonsil, acute tonsillitis, diphtheria, simple hypertrophy, and tubercular disease.

The difficulty in diagnosis cannot be too strongly enforced on the attention of the general practitioner. From a study of the literature of the subject and from my own experience, I am convinced that a large number of the operations have been unsuccessful on account of failure in recognizing the seriousness of the disease. When there is any doubt a portion of the tonsil should be removed, examined immediately by the

microscope, and if found to be malignant, the tumor should be completely excised without delay.

There are two considerations which induce the surgeon to operate. He must either have a hope to remove the disease completely or he must have some confidence that he is able to prolong life and alleviate suffering. When he can do any of these, then, and only then, is he justified in submitting the patient to a severe or perhaps dangerous operation.

In carcinomatous disease cure is very rare. The most successful case I know of is one communicated to me by my colleague, Dr. William Macewen, of which the following is his short summary:

W. P., aged fifty-five years, had right tonsil, large portion of pharynx, and portion of back of tongue removed through incision extending from angle of mouth to the angle of lower jaw on right side, June 27, 1878. I saw him twelve years after in good health; I have not heard from him during the last two years, and I fear that he may be dead. He was sixty-seven years of age when I saw him last.

Dr. Macewen also had another case of removal of an epithelioma of the tonsil, but the patient was only kept under observation for two years, during which he was well.

Besides the cases just described I find only four cases of cancer of the tonsil in which local recurrence did not take place; they are recorded by Quintin, Fowler, Mikulicz, and myself (Case VIII.). The patient operated upon by the surgeon first mentioned was reported to be free from disease two and one-half years after excision of the growth.

In Fowler's ([60]) and Mikulicz's ([74]) cases local recurrence did not occur, but carcinomatous disease attacked other parts. In the former case a very complete operation was performed through an external incision; the lingual and facial arteries were ligatured as well as the external jugular vein. As a consequence of free removal of the tumor and affected glands no local recurrence occurred, but the patient died from cancer of the stomach. Mikulicz's patient remained locally free for two years, when she died of cancerous disease elsewhere. In my own case the patient is still perfectly well (January, 1892), nineteen months after the operation.

Passing now to review the examples of operations for the sarcomata. The most successful operations as far as I know have been recorded by Barker ([2]), Cheever ([4]), Gorecki ([12]), Gansmer ([11]), Homans ([14]), Langenbeck ([18]), Richardson ([29]), and my own case (Case I.). I have communicated by letter with the above-mentioned surgeons and with others, in order to ascertain the ultimate result of their operations; two of my letters have failed to reach their destination from some cause, and in three other cases I have received no reply. It appears to me that all these cases are of great interest; I shall, therefore, quote from the replies which I have received, and I shall take the cases in their order.

Mr. A. E. Barker informs me in respect to one of his cases (that quoted by Mr. Butlin in his book, *The Operative Surgery of Malignant Disease*, page 180) that he was well a year or more after the operation. In his letter he mentions a similar case in which the patient was a female aged twenty years, and where the growth had existed for six months. At the time of the operation the tumor was the size of a walnut, but the lymphatic glands were uninvolved, and there was no recurrence two years after.

Dr. D. W. Cheever says:

> So far as I know, recurrence has taken place in all my cases in from four to six months. It has recurred usually in the glands of the neck, once on the palate. I believe I have now operated four times, always with temporary relief and good recoveries from the operation.

M. Gorecki's patient was reported to be alive and free from disease two years after the operation, and Gansmer's two and one-half years. Dr. John Homans, of Boston, who operated upon a case of sarcoma by external incision on May 30, 1890, informs me that she came to see him on December 10, 1891—

> Looking well. Her health is good, and she has gained in weight. Her general health was never better. There is no sign of any return in the scar of the original operation or in the glands of the neck, but there have been two operations since 1890 for the removal of small affected glands. But now (December 1891) there is no sign of recurrence or development elsewhere.

Langenbeck's patient recovered from the operation, but how long he remained free from recurrence I have failed to ascertain. Dr. M. H. Richardson operated successfully by external incision in 1886; the tumor was a round-celled sarcoma, and the patient has remained well ever since.

In a letter dated December 22, 1891, he says:

> The last time I heard from her she was in perfect health, and was much surprised that I should have written asking if she was still alive.

In my case (Case I.) no recurrence occurred in the primary site of the disease, but the patient died from a round-celled sarcoma of the opposite tonsil five years after the operation.

A few remarks may now be made regarding the palliative treatment, which may be employed in those cases where operative measures are unsuitable. In all cases of malignant disease of the mouth the septic and acrid condition of the secretions causes considerable irritation, and by its local absorption hastens the progress of the disease and causes the patient great suffering, or by being swallowed, seriously interferes with digestive processes. It is, therefore, desirable to cleanse the mouth as thoroughly as possible by the use of antiseptic washes, sprays, or powders. The solution which I first employ in such cases is an alkaline mouth-wash, containing equal parts of carbonate of potassium, borax,

and chlorate of potassium. A teaspoonful of this mixed powder should be dissolved in half a tumblerful of tepid water to which a dessert-spoonful of glycerin with carbolic acid is added, and used as a mouth-wash every three hours. After using this wash for two or three days it is a good plan to spray the mouth two or three times daily with liq. hydrarg. perchlor. for a minute each time after cleansing with the wash. A spray of iodoform dissolved in ether and alcohol also acts well; oil of eucalyptus, a solution of salicylate of sodium, or of sulpho-carbolate of zinc may be used in the atomizer. Again, antiseptic tablets are very easily carried about by the patient. The one which I find most useful is composed of hydrochlorate of cocaine, gr. $\frac{1}{2}$; perchloride of mercury, gr. $\frac{1}{100}$; iodoform, gr. $\frac{1}{2}$; chlorate of potassium, gr. xx; sugar, gr. x. The tablets should be allowed to dissolve in the mouth, but the saliva should not be swallowed. Not only is the immediate discomfort and pain relieved to a considerable extent by the measures just mentioned, but the progress of the disease is delayed.

As the tumor increases in bulk other difficulties and dangers present themselves; pain, difficulty in breathing and swallowing, and the danger of hemorrhages is increased.

Pain may be relieved either by local applications or by the administration of hypnotics. At first a liniment composed of equal parts of hydrate of chloral and camphor, applied over the swelling in the neck, is sufficient to relieve the patient's general suffering when the parts are at rest. But before the patient takes food it will be found necessary to spray the throat with a ten per cent. solution of cocaine. The only difficulty in the employment of this drug is the tendency it possesses to produce copious salivation or cocaine intoxication when used continuously or too freely. When it is not found to act well, a solution of morphine, tincture of belladonna, of stramonium, or other anodyne may be used with good effect as a gargle. As a rule, during the advanced stages of the disease, the pain is so severe that the patient requires to be kept under the influence of morphine by hypodermic injections.

Interference with respiration is also common, either as a consequence of physical obstruction by the growth, from spasm of the glottis, or as a result of the entrance of blood or food into the trachea. Under any of these circumstances the patient may be relieved by tracheotomy, while at the same time, if there is much difficulty in swallowing, the patient may be fed through a soft flexible tube introduced into the œsophagus. Krishaber nourished a patient, who suffered from a malign tumor of the œsophagus, for 305 days through a tube introduced by the mouth, but in the majority of cases of disease of the tonsil the danger of inducing hemorrhage is so great that one would prefer to pass the feeding-tube through the nostril, selecting the one on the opposite side to the diseased tonsil. Partial removal of the tumor may also be resorted

to, but this practice cannot be highly recommended, as rapid increase in the size of the growth soon follows the operation.

Hemorrhage is a very common accompaniment of malignant disease of the tonsils, especially in the round-celled sarcomata and in the encephaloid carcinomata. When bleeding occurs, two dangers present themselves: the patient may die from exhaustion or from suffocation by blood entering the trachea. To prevent the former employ, in the first instance astringent gargles, or, as recommended by M. Plicque, a solution of antipyrine, 1 part in 50, may be used as an hæmostatic. Should such treatment not succeed, then ligature of the base of the tumor, either by one ligature or by several, may be resorted to, or cauterization by the thermo-cautery or galvano-cautery may be used. In the event of none of these means of treatment succeeding, ligature of the lingual and facial arteries may be required, or as a *dernier ressort* the carotid may be tied.

When there are indications of the blood entering the trachea, but more especially if, as a consequence, suffocation is threatened, tracheotomy should be performed and a tamponed tube introduced through the wound. To pass a tube through the mouth and plug the larynx from above is a difficult operation in such cases.

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CYSTIC DEGENERATION OF THE MUSCULAR FIBRES OF THE HEART.

A FORM OF DISEASE HITHERTO UNDESCRIBED.

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In April, 1891, I read before the College a paper entitled, "The Microscopical Anatomy of the Human Heart," which appeared in the *Transactions of the College of Physicians of Philadelphia*, and was published besides in The American Journal of the Medical Sciences for June, 1891. It was then shown that in the human heart in the natural condition the muscular fibres are penetrated by capillaries, and that they are not therefore, as is commonly supposed, mere solid rods. At the same time, I alluded to the fact that I was able to make this observation owing to a certain pathological change which I had noticed in studying diseased hearts—a change by which the nearly solid normal fibres became tubes. So far as my observations extend, this condition is usually most marked in the fibres of the papillary muscles of the left ventricle, though it is common in all other parts of the heart as well. The degree of the excavation varies exceedingly; the cavities may be so small that in some instances it is impossible to distinguish them from capillaries, or, on the other hand, the hollowing-out process may have gone so far that the fibres are changed into tubes with thin walls. The disease may be best studied when the fibres are seen in cross-section, for then its most characteristic appearances are presented. Its presence can, however, be equally positively determined in longitudinal sections, though greater care and discrimination must then be exercised to recognize it. The drawing (Fig. 1) represents types of the morbid changes as they appear when

present in a high degree of development. There are two fibres which are natural; the others have been more or less eaten away in their centres by disease. The destructive process, in its most extreme form of development, removes the whole of the muscular substance from the centre of the fibre, no part of which, when examined with the microscope, will present the usual appearance of muscular tissue except the thin outer walls, and even these (Fig. 1, No. 7) may show the cross-markings characteristic of heart muscle only in places. A curious feature is the way in which the muscle nuclei often lie loosely in the cavities, without attachment to the remaining tissue. This is very different from the natural condition when the nuclei are closely surrounded by the muscular tissue. This separation of the nucleus was very marked in the two fibres represented in Fig. 1 as Nos. 5 and 7. Nos. 3 and 5, and, in a slightly different stage, No. 4, represent another phase of the destructive process. In them, instead of a single large cavity in the centre, there are several smaller holes irregularly distributed through the fibre, and in No. 5 the muscle nucleus lies in the largest of these. The degenerative process is more advanced in No. 4 than in the two others, for in it the only muscular tissue remaining is that constituting the thin outer walls, with a little more which is irregularly distributed through the inner portions, and some shreds of a material which must be the endomysium or fine connective-tissue substance which normally exists in the muscular fibres. It must be understood that these cavities do not usually give the impression that during life they were empty, or even that they contained only a clear liquid, for there is always present more or less material which has no distinguishable structure. Areas presenting this condition are represented in the drawings by the dotted portions. It seems to me that this hollowing-out, when most extreme, is apt to be near the ends of the fibres, toward their point of origin or of insertion. In sections of tissue which show it I have found the hollow fibres most numerous not far from the endocardium or pericardium, and less so deeply in the centre, though, as already stated, it will be unmistakably present in all parts of the heart. The heart which furnished the fibres represented in Fig. 1 was very fibroid, but the hollow fibres were not found in the fibroid portions of it. Fig. 2 was made by the photographic process alone, without retouching, and shows fibres in varying stages of degeneration.[1] In it may be seen several of the same fibres as are in Fig. 1. In this heart, however, I was able to study the disease to the best advantage because it was present in its most extreme form.

[1] The photograph, which is a very beautiful one, was taken by Dr. George A. Piersol, Professor of Anatomy in the University of Pennsylvania.

The patient was a man fifty-seven years of age, who had been very dissipated, having eaten and drunk too much, and having done most things a man should not do. He denied ever having had syphilis, but at sixteen years of age he had an attack of inflammatory rheumatism. He said he had been healthy until recently (about six months before his death), when he became exceedingly short of breath, and had some irregular rheumatism. His condition became gradually worse and worse until he died, after having suffered to an unusually great degree with difficulty of breathing. For many weeks there was general œdema and ascites, also albumin and casts in the urine, and great atheromatous stiffening of the arteries. The post-mortem examination showed fibrosis of most of the organs, including the heart, which was much enlarged. The kidneys were contracted, and there was an extraordinary amount of chalky deposit, which was not confined to the walls of the arteries alone, for there were large deposits in the mesentery and in the posterior walls of the abdominal cavity.

The first case in which I discovered the presence of the morbid change in the heart-fibres was that of a man past middle life, who died with aortic regurgitation. He denied having had rheumatism and syphilis, and he died of exhaustion after an illness of a few months, without ever having had dropsy, or dyspnœa, or any evidence of kidney disease. There was aortic disease, and the heart was enlarged. The kidneys were rather larger than normal, and but slightly diseased. Excessive hollowing out of the muscular fibres of the heart was found.

It is impossible at present to predict from clinical manifestations which cases will present this curious change in the heart. Some idea, however, of its clinical and pathological accompaniments may be gained by contrasting cases in which the disease was present with others not so diseased. As was stated in my paper showing the existence of capillaries in the heart's muscle-fibres, I have in my collection sections of forty-nine human hearts, accompanied in most instances by clinical histories of the patients. In some typical cases of Bright's disease, both of the interstitial (or contracting) and of the parenchymatous forms, hollow fibres were present, and in other like cases I have not found them. In hearts showing great increase of fibrous material, it has in some instances been present and in others absent. It is a curious feature that the vacuolations, when present in a fibroid heart, occupy almost exclusively those portions of the organ not affected by the fibroid overgrowth; in such regions it will be conspicuous by its absence. There are in my collection sections from two hearts showing more marked fibroid overgrowth than any of the others; in one, the hollowing-out of the muscular fibres is very great, in the other there is none of it; in both cases the kidneys were very much contracted. The history of one of these cases has been given in some detail above. Examination of such sections as are in my possession shows the vacuolation of the fibres to be absent in cases of brain syphilis, sarcoma, general miliary tuberculosis, Bright's disease,

pulmonary phthisis, typhoid fever, pneumonia, dysentery, epithelioma of the bowel, and aneurism, and to be present in what clinically was recognized as organic heart disease, Bright's disease, typhoid fever, ulcerative endocarditis, and in young infants that had died of wasting. I have sections from the hearts of a number of foundlings who died during the earlier months of life from the wasting so common among infants of that class, and in some instances vacuolation of the heart's muscle-fibres was unmistakably present, and in others absent. In many respects the histological condition of heart muscle in young infants, as might be expected, is very different from what it is later in life. In a child ten years of age who died with dropsy, and had amyloid disease of the liver, spleen, and kidneys, and of the heart and lungs, too, there was most extreme hollowing-out of the muscle-fibres. Some of the fibres in this case, when seen in longitudinal section, presented small bulbous-looking swellings at points where they were hollow, and thus making it appear that some distending process had occurred where the vacuolations existed. In another child of twelve, with cardiac hypertrophy and dropsy, the vacuolations were also present, but in much less degree than in the previously mentioned case.

It has been my endeavor to describe this pathological change so that it may be recognized by others; and, as previously stated, it was while studying it that I was led to the discovery that capillaries normally penetrate to the very centres of the muscular fibres of the heart. The kind of cases in which the disease was found I have also denoted. It is now desirable to understand, if possible, the nature and origin of the morbid process. The fact that the muscular fibres of the heart are penetrated by capillaries, and are not, therefore, truly solid bodies, together with the appearance of the spaces already described, lead to the almost inevitable conclusion that the process is one of cystic degeneration. The only other conceivable explanation is that the cavities are minute aneurisms, being dilatations of the capillaries after they have passed into the muscular fibres. Such an assumption, however, would seem to be negatived by the nature of the material which lies within the cavities. Any material visible is amorphous and granular, or is yellowish pigment in irregularly shaped flakes, all looking as if suspended in a liquid, and thus presenting the precise characteristics of any section of a cyst. If the process be one of multiple capillary aneurism, fresh blood should be found in the spaces instead of the detritus described. Such being the case, it would seem hard to escape from the conclusion that the cavities are true retention-cysts, and that they are produced in a manner parallel to that of renal cysts. A capillary must become blocked in two places and the portion between these dilate, and thus a cyst be formed. It is, of course, quite possible that the vacuolations are

false cysts formed by the escape of blood into the substance of the fibres (hæmatocele), or by degeneration and softening of the muscle-substance itself. This, though quite admissible as a possible explanation of the pathological process, is much less likely to be the real one than is the supposition that they are true retention-cysts; for, in the first place, there are in the fibres cavities, the capillaries, in which cysts might form, and, in the second, the contents are precisely similar to those common to cysts. These cavities present another characteristic which is common also in renal cysts. Shreds, or festoons, or shelf-like projections of connective tissue hang irregularly across the cavities. Nos. 3 and 4, Fig. 1, exhibit this appearance.

If time and the progress of events should establish that these minute cavities in the heart's muscle-fibres are true retention-cysts, having their origin within capillaries in the fibres, it will be the first time that it has been shown that cysts do originate within the vascular channels, as they are already so well known to originate within other channels, as, for instance, the renal tubules and other gland ducts. There seems to be no reason in the nature of things why such should not be the case.

The presence of capillaries within the muscular fibres of the heart, a fact in normal anatomy, and the occurrence of cysts within the fibres, a fact in pathological anatomy, and the fact that the one observation led to the other, are an illustration of the correctness of the view so much dwelt upon now, that the two branches of science, normal and pathological histology, have close and important relations. In this instance the train of events was as follows: first, as the result of pathological study, the recognition of the comparatively large cavities in the fibres, which at that stage were inexplicable. From this came the desire to examine more minutely the histology of the human heart, and this resulted in the observation that the capillaries not only closely surround the fibres, but that they actually penetrate them, a fact which seemed at first in no way connected with the holes eaten into the fibres by disease. Lastly, further and more careful consideration leads to the conclusion that the larger spaces which result from disease are but cystic dilatations of the natural blood-channels.

It is important to remember that this disease, which I have called cystic degeneration, is very common, and has been found by me to be present in many ordinary well-recognized diseases. What bearing it may be found to have clinically is, of course, impossible now to predict, but it seems not unlikely that it may be important. The thoughts certainly are new ones, both that cystic disease may have its origin in the vascular system, and that it is a common cause of degeneration of the heart, an organ which is so prone to degenerate, and degeneration of which is so far-reaching in its results.

Explanation of Figures.

Fig. 1.—The Nos. from 1 to 6 inclusive represent heart muscle-fibres in cross-section, and were all drawn from the same microscopical preparation. No; 7 was drawn from a preparation in which the fibres were cut longitudinally. The camera was used, and they were drawn to scale, the amplification being five hundred diameters. Nos. 1 and 2 are ordinary fibres, and present no evidence of disease; they were put in the picture to contrast

Fig. 1.

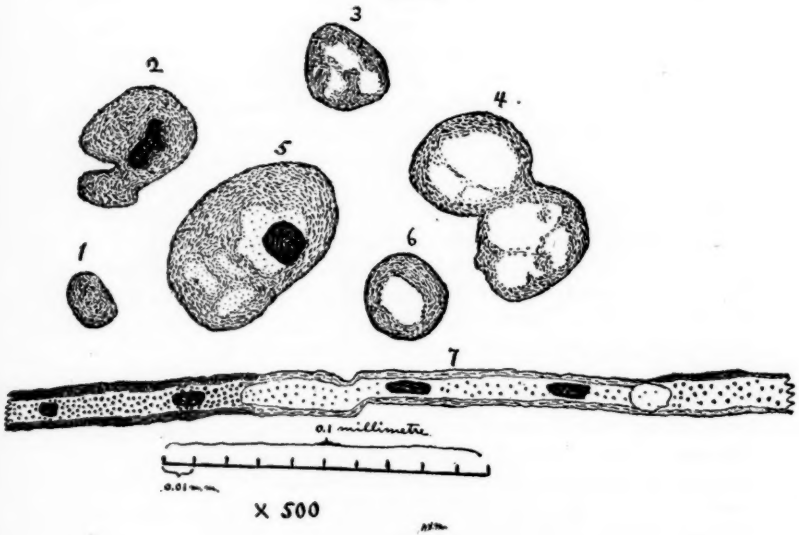
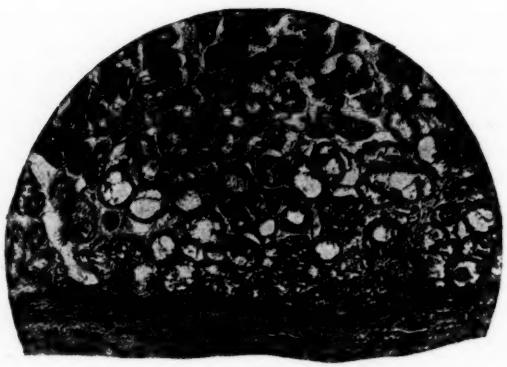


Fig. 2.



with the other fibres which are diseased. The irregular shape of the nucleus shown in No. 2 is not unusual. The other fibres present evidences of advanced disease. Nos. 3, 4, and 6 look as if irregularly hollowed out, the dark areas being intended to represent the muscular tissue and endomysium (intramuscular connective tissue), while the lighter portions are areas from which the muscle-substance has disappeared as a result of disease. No. 5 is a large fibre, showing several spaces from which the muscle-tissue has gone, the space being empty, or filled with a more or less granular material. There is also a nucleus which lies in a space which is empty or filled with slightly granular matter, this being represented in the drawing by a dotted area. No. 7 is a drawing of a fibre cut longitudinally, and very well shows the irregular hollowing-out process or vacuolation which has taken place. The fibre looks as if it had been converted into a hollow cylinder divided into several compartments. The drawing was made to show that at the sides of the fibre the muscular tissue still persists, in places the cross striæ even being distinguishable, while the dots in the central portion are intended to indicate the more or less granular appearance. The nuclei lie as if they had been loose in the central space, not being in any part in contact with the muscular tissue remaining. The drawings are diagrammatic, but the dimensions and outlines are correct.

Fig. 2.—This is a photograph (a half-tone) of a single field, under the microscope, of the papillary muscle of the left ventricle from the same case as the drawings were made. Several of the fibres in the drawing are in this picture. It admirably shows the manner in which the interior of the fibres has been irregularly eaten away by disease. Neither the negative nor the print from which this was made was retouched.

NOTE.—It should have been mentioned that the sections of tissue from the appearances of which my conclusions were drawn were prepared, as far as possible, upon a uniform plan, both for the preservation of the tissue and the mounting of the sections. I thought that if this was done the unnatural appearances could with more certainty be attributed to disease than if different methods were used, in which case it might be thought that what I described as disease was due to faulty technique. The tissues were almost all preserved in seventy per cent. alcohol, and the imbedding material was paraffine, except in a few instances, when celloidin was used. The staining material was borax carmine. Considering the imbedding material employed, and that the sections were often cut from parts of tissue far from the surface of the pieces, it would be unreasonable to suppose that what I have called hollow muscle fibres were fibres from which the centres had fallen out in process of preparation—a possibility which would strike every practical microscopist.

A CONTRIBUTION TO THE STUDY OF CHOREA, WITH SPECIAL REFERENCE TO ITS CONNECTION WITH RHEUMATISM AND HEART DISEASE.

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The question of the connection between rheumatism, heart disease, and chorea has been long agitated, but with far from satisfactory results. The problem is by no means so simple as it might at first thought appear. The first question is, whether there be any connection at all between the three conditions—a negative reply to which proposition would dispose of further discussion. Granted, however, there be a connection, is it between rheumatism and chorea, heart disease and chorea, or between all three, as a result of the same pathological condition? In the latter case what is the sequence? That rheumatism leads to heart disease is an established fact. Does the heart disease thereby engendered cause chorea, or does rheumatism cause chorea, the heart disease being merely an accompaniment and in no degree a factor in the etiology?

When we realize that in the great majority of the cases clinicians have had merely the report of the parents to rely on regarding the question of rheumatism, and when, again, we realize the personal equation in estimating the existence of heart disease from given conditions, subjective and objective, the difficulty becomes apparent—a difficulty by no means lessened by the fact that pains in the limbs are frequent in children (so-called growing-pains), and that the designation rheumatism is an extremely convenient one for the practitioner as well as the family to gratify the craving for absolute diagnosis.

The last branch of the question is—given a connection between rheumatism and chorea, heart disease and chorea, or rheumatism *and* heart disease and chorea—What is the nature of the morbid process?

The writers would here disclaim all assumption to the settlement of these points. The object of this paper is rather to discuss, and possibly to offer some suggestions.

In looking over the literature one is struck by the lack of definiteness of statement. Hughes and Bennett,[1] for example, state that out of one

[1] Guy's Hospital Reports, 3d series, 1855, vol. i. p. 217.

hundred and four cases of chorea only fifteen had not had rheumatism or a cardiac murmur. This statement probably embraces cases with either rheumatism or organic or functional heart disease, as well as those having combinations of the three, rendering the statistics far too vague to be of material aid in solving so complicated a problem.

Another author speaks of cases of acute rheumatism and pains, leaving one again in doubt just what class of cases were included.

The estimates of different writers vary greatly, as may be seen from the following quotations from among them:

Flint[1] states that facts do not warrant the conclusion that the affection is to be described as essentially rheumatic. The most that can be said is that children who have had this disease are apt to become affected with chorea.

Syres,[2] from an analysis of 146 cases, finds that 6.16 per cent. only could be by any possibility attributed to acute rheumatism. He finds, however, rheumatic antecedents, not causal, in 23.97 per cent. and a rheumatic inheritance in 47 cases; the causes assigned by friends in 94 cases being nervous strain (fright, distress, school over-pressure). In 20 cases he found a persistent systolic murmur over the apex, 11 of which cases had had acute rheumatism. A murmur disappearing on recovery existed in 14 cases. He cautions clinicians against mistaking vague pains for rheumatism.

Leroux[3] finds on an analysis of 80 cases 5 with rheumatism—that is, 6¼ per cent.; a mitral murmur in 5, only 1 of whom had had rheumatism, anæmic murmurs in 8.

Steiner, out of 252 cases, finds only 4 in the course of rheumatism, and thinks the difference in statistics must be due to the nationality.

Rhomberg and Grisollo considered rheumatism and heart disease as accidental complications of chorea.

Niemeyer[4] considers the connection between rheumatism and chorea not constant, but states that certainly many cases of chorea have had rheumatism. Certainly, also, heart murmurs often follow rheumatism, even after deducting those due to anæmia and disturbances of nutrition, often enough to determine an endocarditis complicating rheumatism.

Strümpel[5] states that although the statement of certain authors that almost every case of acute rheumatism in children is followed by chorea is far too strong, yet the sequence is comparatively frequent. Chorea is often seen with mild chronic rheumatism, or in valvular cardiac disease with or without rheumatism.

[1] Practice of Medicine, 1873, p. 742.
[2] Lancet, Dec. 21, 1889; Archives of Pædiatrics, July, 1890.
[3] Rev. Mens. des Malad. de l'Enf., Juin, 1891.
[4] Pathologie und Therapie, vol. ii. p. 411.
[5] Text-book of Medicine, 1887, American translation, p. 739.

Sée found 61 in 128 cases who had had articular rheumatism, but in only 32 were signs of rheumatism undoubted—that is, 37.65 per cent. doubtful, 25 per cent. certain.

Sturges[1] states that there were only 20 in 100 at the utmost, counting doubtful cases, and in these the rheumatism was the immediate cause in only 3 or 4—that is, 20 per cent. doubtful.

Money,[2] out of 214 cases, found rheumatic fever in 33, rheumatism in 23, doubtful in 9—that is, an undeniable rheumatic history in 16 per cent., possible in 29 per cent.

Ross[3] mentions rheumatism as one of the most frequent and important causes of the disease.

Gowers[4] finds 24 per cent. of rheumatism, and says that heart disease may follow or precede chorea. He finds cardiac disease in three-fourths of the cases where rheumatism existed, and in one-third of those without —that is, in 43 per cent. of the cases altogether.

Ziemssen[5] found 6 cases of rheumatism in 25—that is, over 25 per cent., and draws the conclusion from these observations and those of Copeland, Senhouse, Forgous, Bright, Babington, Hughes, Monckton, Hillier, Romberg, Trousseau, and others that there is a close relationship between chorea and rheumatism.

Senhouse, Heslop, and Roger held that chorea and rheumatism, pericarditis and endocarditis were common expressions of the same pathological process, Roger considering that chorea appeared generally at the decline of the rheumatism.

Perhaps one of the most complete additions to these statistics is that of the committee of investigation from the British Medical Association, the report of which was prepared by Mackenzie, based on 439 cases, resulting in a percentage of 26 per cent. with rheumatism.

Goodall,[6] in an analysis of 262 patients, found 65 cases of systolic, non-organic apex murmur, 33 cases of systolic mitral regurgitant murmur; of which 33 cases 22 had had rheumatic fever. He found 4 cases with similar results together with pericarditis, 3 of which cases had had rheumatic fever; 13 cases of mitral stenosis, 2 of which had had rheumatic fever; 1 of aortic stenosis, with no history of rheumatic fever; 2 cases of double aortic disease, 1 with mitral regurgitation, and 1 with mitral regurgitation and pericarditis; 4 cases of pericarditis without valvular lesion, 3 of which had had rheumatic fever; 10 cases of systolic basic murmur, probably hæmic; 1 case of loud systolic universal mur-

[1] Lancet, 1878, vol. ii., p. 283, and 1879, vol. ii. p. 789.
[2] Brain, 1882 and 1883, vol. v. p. 512.
[3] Diseases of the Nervous System, 1883, vol. ii. p. 768.
[4] Ibid., 1888, p. 959.
[5] Pathologie und Therapie, B. xii., H. 2, S. 443.
[6] Guy's Hospital Reports, London, 1890.

mur, with a history of rheumatic fever—that is, 55 cases of valvular organic disease. There were 42 cases of fright; in 5 of these rheumatic fever had existed; 3 cases of imitation, 2 of which had had rheumatic fever; and 8 cases came on very soon after a fall or head injury, 1 of which had had rheumatic fever. There were 10 cases of chorea of pregnancy, 7 of which were married.

We find opinions varying, therefore, all the way from the view that the coincidence of these diseases is mere accident, to that considering them expressions of the same pathological process. Reverting to figures, we find recorded percentages varying all the way from 6 per cent. to 26 per cent. of rheumatism preceding chorea, and of heart disease from 13 per cent. (Syres) to 43 per cent. (Gowers).

It is apparent that no one set of statistics will decide this question, but that many more series of cases must be taken, and that the evidence must finally be carefully weighed, not only as regards quantity, but quality.

The contribution which we would offer toward this end is the careful analysis of 76 cases which we have seen in conjunction during the past two years, most of them at the Massachusetts General Hospital. The number might have been greatly increased had we depended upon cases seen separately, and even have been swelled to over 500, had we trusted to the records in the neurological and general out-patient departments of the Massachusetts General Hospital. We have chosen, however, to place accuracy before numbers.

As regards the neurological branch of this investigation, "habit chorea" was carefully excluded, as well as the choreic movements of hysteria, and those of gross organic disease of the brain—*e. g.*, post-hemiplegic. As regards the investigation of the heart, great pains were taken to distinguish between functional and organic disorders. Weight was not laid upon any single sign exclusively, but the diagnosis was based upon the entire group of objective symptoms—the size of the heart, the presence or absence of a thrill, the location of the murmurs heard and the direction in which they were transmitted, the accentuation or non-accentuation of the pulmonic second sound, and the evidences of venous stasis.

As regards the question of rheumatism, vague pains were not included under rheumatism, even when situated in the joints, but a history of "pain, heat, redness, and swelling," was carefully sought, and only those cases included under rheumatism where the history was sufficiently accurate to render probable the existence of true rheumatic inflammation.

In these 76 cases 36 were found to have no possible history of rheumatism and no question of cardiac disease, either functional or organic —that is, 47.37 per cent. There were found to have had rheumatism

without heart disease only 3—that is, 3.94 per cent. Of organic heart disease without history of rheumatism, were found 11 (14.47 per cent.); of both heart disease and rheumatism, 10 (13.16 per cent.); of functional heart disorder 11 (14.47 per cent.); of rheumatism with irregular heart, 5 (6.58 per cent.); of vague pains without rheumatism, 13 (17.10 per cent.). (Out of these 13 cases 3 had organic, 1 inorganic, 1 doubtful heart disease, and the remainder no question of heart disease, being, therefore, also included under these headings.) Two cases had doubtful rheumatic history, and 2 questionable heart disease. One of the cases of organic heart disease was probably congenital.

The total percentage of rheumatism from these statistics is 23.68—closely coinciding with the results of Gowers, Ziemssen, and the committee of the British Medical Association.

The total percentage of organic heart disease is 27.63.

Taking, now, all authorities together, and adding our own observations, we are in position to consider what facts are established, and what are still doubtful.

I. There can be no doubt of the fact that chorea *may* arise without suspicion of either rheumatism or cardiac disease, either functional or organic. Even Hughes and Bennett allow an estimate of 15 out of 104, a proportion which seems low at first sight, but which is by no means startling when we realize the frequency of inorganic heart murmurs in this affection due to anæmia, as well as the frequency of cardiac irregularity resulting from the chorea itself. We have ourselves found over 47 per cent. in which neither rheumatism nor heart disease, organic or functional, existed, nor had existed as far as known; and even if cases of vague pains should be included under rheumatism, the proportion would only be reduced to a little under 40 per cent. These cases, taken together with many authenticated instances of chorea produced by fright or other emotional excitement without question of rheumatic or cardiac origin, lead to the establishment of the fact that neither of these conditions is essential to the production of chorea.

II. The preponderance of evidence up to this time points to the fact that both rheumatism and organic heart disease are found more frequently in the present or past experience of choreic patients than can be accounted for by mere coincidence. As stated above, we have found, out of 76 cases, a distinct history of rheumatic fever without heart disease in 3; with organic heart disease in 10; with inorganic heart disease in 5; and a doubtful history of rheumatism in 2—making a total of 18 quite certain (23 per cent.), and 2 doubtful cases—certainly a very large proportion for a coincidence.

It may also be said of the statistics of others, taken as a whole, considering the number of observers, the number of cases, and the quality

of the work, that the preponderance of evidence carries the average observation considerably beyond the limit of coincidence.

Again, in our 76 cases 11 had organic heart disease without rheumatism, in addition to the 10 already mentioned, in which they existed together, making a total of 22 with organic cardiac disease—again a large proportion for coincidence, as well as too many to admit of the supposition that the heart disease was a complication merely coincident to the rheumatism. In 2 more cases there was question of organic heart disease, and in 11 more inorganic heart disease existed without rheumatism.

Other authors have not furnished so exact statistics on the condition of the heart as on the question of rheumatism; but Gowers, above quoted, finds it present in three-quarters of the cases with rheumatism and one-third of the cases without, making a total of 43 per cent.—a still higher percentage than our own. As an example of a lower proportion may be noted Syres, quoted above, who finds 13.69 per cent. with structural cardiac disease and 43.8 per cent. with heart affection other than organic. But this proportion even exceeds the limit of coincidence, as, surely, not 13 per cent. of cases taken promiscuously from the records of children under hospital treatment for other diseases would be found to have organic heart disease.

Further figures upon this point are more needed than upon the question of rheumatism, but, on the whole, it seems to us that the proportion already gathered from the literature points in the same direction as our results.

Far from being biased in our investigation by previous statistics, it is only fair to say that we started out with a preconceived idea that, on the whole, the connection between these diseases had been considerably overrated, an *à priori* view which our facts have led us to modify materially.

Again, among the fatal cases of chorea, nearly all have been found, on post-mortem examination, to have organic heart disease.

Goodall found that in eleven fatal cases all had valvular disease of the heart.

Watson found that ten out of twelve fatal cases had organic cardiac disease.

The preponderance of evidence, on the whole, is in favor, then, of the theory that some connection exists between both rheumatism and heart disease, independently considered, and chorea.

The numerous cases in which the three affections have appeared in stormy fashion, either simultaneously or closely following one another, tend to show that this view is applicable to one class of cases, though not to all.

A single illustrative case may be adduced, seen by both the writers in consultation with Dr. F. B. Harrington.

CASE.—R. L., a girl, aged five years. A month ago was attacked with rheumatic fever, with swelling of the knees and ankles, and pain so severe as to prevent motion. Extreme dyspnœa supervened and rapidly increased. Prominence of the left thorax was soon visible. A few days later universal choreic movements appeared and became rapidly violent, affecting speech and deglutition. Examination of the heart showed a rapid, irregular, and feeble action, with enlargement of the area of cardiac dulness, a systolic and presystolic murmur at the apex, with presystolic thrill at the apex, and accentuation of the pulmonic second sound. In addition to these signs there was a harsh to-and-fro murmur along the left edge of the sternum, near to the ear of the listener, undoubtedly due to pericarditis.

Death ensued within a week; no autopsy was made.

This is a typical case of that form of chorea which terminates fatally, organic heart disease being found in the majority of such cases, as we have said. It is unfortunate that no autopsy could have been made on the central nervous system, but a sufficient number of autopsies have been made, in such cases, to render it extremely probable that organic changes (emboli) were present in the brain.

This brings us to the question—granted a connection between these diseases—What is its nature, and, in general, what is the pathology of chorea? Is any one pathological theory applicable to all cases, as many authorities have endeavored to show?

Among the changes found in fatal cases may be mentioned—*a*, emboli, varying from minute and scattered to those of appreciable size, in the cerebrum, more particularly in the gray matter of the cortex and basal ganglia (Gray, Elischer, Broadbent, Tuckwell); *b*, hydrocephalus; *c*, meningeal hyperæmia; *d*, hemorrhages; *e*, softening; *f*, hyperplasia of connective tissue and proliferation of nuclei; *g*, alterations in the vessels and perivascular regions; *h*, perivascular infiltration in the medulla and pons, with slight hemorrhages (Nauwerk); *i*, dilatations of minute arteries in the brain and cord, especially in the corpus striatum and thalamus, with hemorrhages (Broadbent); *j*, degeneration of cortical cells (Meynert); *k*, degeneration of nerve elements in the corpus striatum (Elischer).

Changes have also been found in the spinal cord and peripheral nerves;[1] not, however, with a sufficient constancy to draw our attention from the brain as the principal seat of disturbance, more particularly those portions of the brain composing or surrounding the motor tract.

Let us now review briefly some of the theories of the pathology of chorea.

Kirk supposes that inflammatory products from the cardiac valves,

[1] The experiments of Legros and Onimus, in 1870, pointed toward a spinal origin in dogs; such observations have not received sufficient confirmation to affect materially the above conclusion.

mingling with the blood, disturb the functions of the central nervous system. This is somewhat vague, and it would seem rather that, in such case, some definite lesion in the vascular system, multiple perhaps, but tangible, must be produced by these inflammatory products, especially when we remember the unilateral nature of the chorea frequently associated with cardiac disease, not only the choreic movements involving one side, but also the paresis.

Broadbent[1] considers the choreic movements due to widely spread hyperæmia of the nervous centres; of this we have no more evidence than we have that persistent anæmia produces the incoördinate movements by lowering the vitality of the cerebral cells.

The same author mentions the suggestion that hyperæmia with capillary blood stasis or capillary thrombosis by cohering leucocytes may be accountable for the disturbance, but neither blood stasis nor thrombosis is a constant condition in chorea.

Again, it has been suggested that prolonged arterial spasm from persistent reflex irritation (uterus or intestines) may lower the functional vigor of the ganglia. This theory is allied to the vasomotor theory of hysteria, and has a certain plausibility, but is, of course, purely conjectural.

Joffroy[2] considers chorea a cerebro-spinal neurosis of development, or disease of growth. He says: "It is to the nervous system what chlorosis is to the vascular."

Gowers inclines to the old theory that a morbid state of the blood, probably chemical, produces both endocarditis and chorea—a state probably allied to that producing rheumatism. Of the mechanism by which the abnormal blood state produces chorea, he states, we are ignorant, but he considers that a certain receptivity of the central nervous system is an essential prerequisite.

Koch considers chorea an infectious disease, and states that the choreic virus may produce either rheumatism or choreic endocarditis.

Sturges supposes a purely functional pathology, an activity in excess of the stability of the nervous system—in other words, lack of establishment of the lines of resistance.

J. Lewis Smith lays stress upon intestinal and uterine disorders, as well as upon anæmia, the "neuropathic state," as fright and imitation among the causes of functional chorea, but also considers rheumatism and heart disease important factors, and calls attention to the fact that organic heart disease may exist without murmurs.

The effort among most authors seems to be to adapt one explanation to all cases. But are the comparatively few fatal cases to fix the path-

[1] Quain's Dictionary of Medicine, 1889.
[2] Sajous's Annual, 1889.

ology for all forms of the disease, and are we to assume, as suggested by Ziemssen, that in the milder cases a minor degree of the same pathological process exists? and conversely, are we to assume that all cases are functional? The former supposition seems hardly satisfactory when the comparatively mild course of the average case under arsenical treatment is considered. In the Nervous out-patient department of the Massachusetts General Hospital, where this treatment is pushed in practically every case from the outset, among the extremely numerous examples of this disease it is rare to find a case severe enough to furnish the students a satisfactory illustration of the subject. Just how arsenic should dispel such serious pathological conditions as above mentioned, it is difficult to understand. Nor, again, does it seem quite satisfactory to suppose the change in fatal cases is a purely functional one. It seems rather that we must recognize two quite distinct classes of this disease, the one with a definite organic basis, the other functional.

As regards the mechanism of the abnormal mobility we are, as Gowers states, still in the dark, and it is perhaps premature for anyone to offer conjectures at this stage of our knowledge. We shall certainly make no endeavor in this direction.

That the disease may, in certain cases, be purely functional is rendered more than probable by the universally recognized cases of chorea appearing during the event of menstruation, and recurring at childbirth; again, by the cases, to which allusion has already been made, produced by fright or trauma. In the former cases the process is probably purely reflex to uterine disturbance, in the latter set up by psychical irritability without organic change. In many of these cases the thought would suggest itself that choreic movements, like infantile convulsions, migraine, and other functional disorders, may be often purely reflex—a symptom rather than a disease. This idea has been carried to an extreme by Stevens, and others who have followed him. This author apparently regards most cases of chorea, as well as epilepsy and migraine, as secondary to eye-strain. While the clinical results of treatment have not established this view, and while from an *à priori* standpoint it might be questioned whether the irregularity of action of the ocular muscles were not rather, like that of the cardiac muscle, a result rather than a cause of chorea, certain cases have undoubtedly been relieved by proper ocular treatment, as Dr. Cheney has also shown.

The abandonment of this view as extensively applicable does not, however, preclude the idea that chorea may be often reflex, though not merely to eye-strain. Persistent hiccough, convulsions, vomiting, and other symptoms of cerebral irritability, are recognized as often reflex to disease of other localities, and, to recur to the question of rheumatism, the idea advanced by Dr. Cheney, that chorea may possibly be set up sometimes as a reflex to joint disease, is worthy of consideration. In early

life, before the adult inhibitory processes have become established, comparatively slight irritation in certain localities certainly suffices to produce marked cerebral symptoms, and it is not impossible that the joints may prove to be among these localities. In fact, a certain alliance between rheumatism and functional nervous disease has long been recognized. The tendency for both affections to occur in the same family has been pointed out, especially by Feré. Some authors have called attention to the cerebral symptoms not infrequently associated with rheumatism, and the term cerebral rheumatism has even been applied by some clinicians, though the writers would by no means commit themselves to a belief in such a condition as a distinct entity.

The atrophy of muscles, frequently associated with rheumatism, should not be forgotten, as pointing to a neuropathic element in this disease; this atrophy being, as Strümpel first pointed out, far too marked to be explained by mere disuse—the term joint-atrophies, proposed by this writer, having been now universally adopted.

Again, the rapidity with which rheumatism changes its location, points to a nervous element in its pathology.

The objection to the theory of joint reflex is that the chorea generally appears as a sequel to, rather than during the attack of rheumatism. It is not impossible, however, that rheumatism and chorea are manifestations of the same neuropathic tendency.[1]

Assuming the possibility of chorea as a reflex to rheumatic inflammation, shall we also suppose a reflex chorea may be dependent on organic heart disease? for we have still a large proportion of cases where heart disease existed without rheumatism—too large a number, as we have already stated, to be explained by mere coincidence. This can hardly be regarded as probable. It is far more probable that those cases where organic heart disease alone exists should be entirely removed from the question of reflex causation, and classed either among the cases with probable organic cerebral basis in varying degree—that is to say, emboli and other vascular disturbances, or among those where depletion of blood produces weakness and irritability of cerebral nerve-cells.

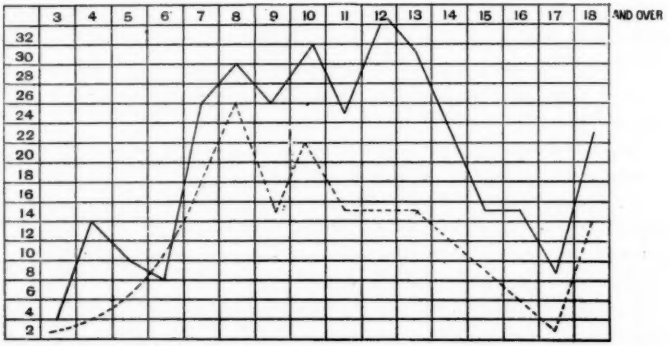
The preponderance of female patients, both during the advent of menstruation and throughout adult life, certainly points to a functional origin, in a large class of cases, at least. Koch finds, for example, 167 females to 100 males (three to two). Gowers finds over five to two in a collection of 1365 cases of his own and others. Broadbent finds chorea more than twice as frequent in females as in males, especially after the age of nine. Goodall finds 188 females to 74 males (five to two). Our own statistics on this point, taken from 490 cases in the records of the

[1] M. F. Cox: Sajous's Annual, 1890. Duckworth: Liverpool Med.-Chir. Journal, July, 1891.

Neurological department of the Massachusetts General Hospital, shows 300 females to 190 males, or about three to two—closely approximating the observations of Koch.

The following chart is instructive in connection with the question of chorea as a reflex. This chart represents the comparative ages of onset of chorea in boys and girls—taken from the 490 cases already mentioned. From this it is evident that the maximum age in boys is between seven and eight, the line falling rapidly from this point.

The dotted line represents males; the continued line, females. The ages are at the top, the number of cases at the left. In girls the line



continues high until the age of twelve to thirteen, then falling, there being twice as many girls at the age of thirteen as boys, whereas the number at eight is the same in both boys and girls. This would point to the fact that the additional number of cases in girls, as compared with boys, is due entirely to those arising during, or after the age of puberty. It is also worthy of note that many more females have chorea in adult life than males. According to our statistics, there were 22 cases of chorea occurring at eighteen or over in females, 13 in males; this proportion being greater than that of the absolute number of females to males, which was three to two. A similar chart may be made from the cases of Goodall, previously quoted, although the maximum age in boys was ten in Goodall's results, instead of seven to eight, as in ours. The curve in Goodall's cases, however, rises rapidly from ten through twelve in females, whereas it falls directly from ten in males.

Conclusions.

1. Neither rheumatism nor heart disease is essential to chorea.

2. The preponderance of evidence points toward the conclusion not only that rheumatism and organic heart disease conjointly appear more fre-

quently in the choreic subject than can be accounted for by coincidence, but that the same is true of each of these affections separately. It follows, therefore, that (*a*) rheumatism predisposes to chorea, and (*b*) organic heart disease has the same tendency.

3. (Drawn from the observation of others.) Fatal cases are generally associated with organic heart disease, and probably with organic disease of the central nervous system (notably cerebral emboli).

4. There is a large class of functional cases—largely reflex, and fostered by circumstances tending to produce functional symptoms in general.

5. The pathological connection betweeen rheumatism and chorea, excepting in the cases where emboli are produced by accompanying endocarditis, is still obscure; probably no one theory is applicable to all cases.

6. The mechanism by which the peculiar phenomena of chorea are produced is unknown.

UNUNITED FRACTURES IN CHILDREN.

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The subject of fractures is one which has always had a peculiar interest for American surgeons, and the literature in connection with it is therefore very extensive. As I do not find that any surgeon has paid especial attention to ununited fractures occurring in children, I have thought it worth while to put a few notes together, which I hope may prove useful as well as interesting to those surgeons who are attached to children's hospitals, or who are otherwise brought into frequent contact with children who have sustained injury.

Ununited fractures are undoubtedly rare in children, but nearly every surgeon who has much to do with the treatment of the surgical diseases of children can probably recall one, or perhaps more cases of non-union which have come under his notice. Some of them have been published in the various medical periodicals of the world, and I have recently been at the trouble of collecting and tabulating some of the more accessible.

In the unrivalled collection of cases of ununited fractures compiled by Dr. Frank Muhlenberg, and published in the first volume of Professor Agnew's *Principles and Practice of Surgery*, no less than 685 cases are recorded and analyzed. This table includes pseudarthrosis met with at all periods of life, and amongst them I find 28 cases occurring in children under ten years of age. Sir James Paget[1] records 3 cases which

[1] Studies of Old Case-books, London, 1891, pp. 130–135.

came under his own observation. From other sources I have been able to collect, more or less, full particulars of 40 cases, so that the total number which I have been able to gather together is 71.

This table I have recently had the honor of laying before the Fellows of the Royal Medical and Chirurgical Society of London, but it is too long to reproduce, and I will therefore only state the general conclusions which I deduced from it. Of the 71 cases, 7 occurred in the clavicle, 9 in the humerus, 12 in the femur, 42 in the leg, and only 1 in the forearm —a result which is very surprising when it is considered that statistics show the forearm to be more often broken than any other bone in a child's body. Ununited fractures are a little more commonly met with in girls than in boys; they are equally frequent on the right and left sides of the body. The most unsatisfactory point in connection with ununited fractures in children is the frequency with which all operative measures fail to effect union. Thus, of the entire number of 71 cases, firm bony union was only obtained in 6 children, whilst of the others some remained in their former condition, some received slight benefit from a very prolonged and often hazardous course of treatment, whilst others, as was too often the case, underwent that "opprobrium of surgery," amputation, in order to be relieved of a limb which was worse than useless.

It is important, therefore, to ascertain the causes which appear likely to lead to this condition, because, although everyone recognizes how often broken bones are met with in children, it does not seem to me that they quite realize the ease with which these injuries may be overlooked, without any blame attaching to the practitioner; and, when they are overlooked, how disastrous may be the results of such an error in diagnosis.

The cause of the non-union of fractures in children is always local, and is, I believe, want of rest.

The want of rest may be due to a variety of causes, which may be classified in the following way:

1. *Errors in diagnosis.* In children there are many causes which may lead to difficulty in diagnosticating a fracture. In the first place, infants may be born with one or more of their bones broken. Mr. Thomas Smith related an interesting example of such a case to the Fellows of the Royal Medical and Chirurgical Society of London.[1] It occurred in the fifth child of perfectly healthy parents, who could never assign a precise cause for the condition. The mother was accustomed to have very tedious labors, but in this instance there had been unusually violent action of the uterus, followed by prompt expulsion of the child early in the course of labor. The baby was brought to Mr. Smith

[1] Proceedings, vol. iv., 3d series, p. 41.

within a day or two of its birth, and on examination all the long bones were found to be broken, so that the least movement of its body caused a grating sensation. As it could not be dressed, it was swathed in Gamgee's dressing, and placed in a sort of tray moulded to its shape. All the fractures united within six months except that of the right femur. This is, of course, an extreme case of congenital fracture, occurring either during or immediately after labor. Similar instances, however, where only a single bone is injured are of no infrequent occurrence. As may easily be imagined, if such a child is entrusted to a nurse of the ordinary type of midwife met with in the country, such an injury is almost certain to be overlooked, with the disastrous results to which I shall presently call attention.

There is another class of congenital fractures which is very liable to be overlooked even when an examination is made by a highly skilled person. In this class of cases the fracture has occurred subperiosteally, or may be of the ordinary green-stick type. Admirable examples of both these classes are preserved in the museum of the medical school attached to the Westminster Hospital. In these cases dissection alone would reveal the injury, and there is no doubt that under ordinary circumstances they would readily be repaired. If, however, the child were to be neglected, or roughly handled, the periosteum might readily be torn through, or the green-stick variety might be rendered complete, when in both cases an ordinary fracture will occur. In such a child, too, the violence necessary to produce this result might be so slight that the fracture might be truly called spontaneous.

In fat children, again, a green-stick fracture is especially liable to be overlooked by the mother and the doctor, and it is probably not recognized until the production of callous a week or ten days after the injury renders it obvious. It appears from an examination of cases that such cases of unrecognized fractures being allowed to go about without restraint give rise to a certain proportion of the ununited fractures met with in children.

2. *Carelessness* on the part of the child's attendant appears to be a factor in the causation of ununited fracture. This carelessness is usually manifested by delay in calling for skilled advice; this may be from simple callousness, as occasionally seen amongst the class of patients who frequent the out-patient rooms of hospitals; more often, however, simple inattention is the cause of the delay. The child is sent out under the care of a small nurse, who either drops it, or allows it to damage itself in some other way, and is afterward too frightened to tell the mother on her return home. The mother notices that the child is peevish, but attributes its irritability to general rather than to local causes. If she be nuusually observant, she brings the child to the doctor in a week or ten days' time, saying that it has "a lump," and this on examination proves

to be callous, marking the seat of the fracture. If this happens when the fracture repairs, it must, of course, be equally frequent in cases of non-union, and, indeed, in looking through the histories of such cases I have been struck with the constant repetition of the phrase, "The fracture remained for a time untreated," or, which is nearly as common, "It united in bad position, and was subsequently refractured and put up straight, when it failed to unite," in both cases showing that proper care was not taken from the beginning. Carelessness on the part of the parent is often the result of mere ignorance of the simplest laws of domestic surgery, and it is therefore well to give a little simple advice in every case of fracture which is brought under one's notice. In an ideal state every broken bone would be treated under the immediate and constant supervision of a surgeon, but in a large town this is impossible, nor can every child with a broken forearm, or clavicle, or tibia be taken into a hospital. It is well, therefore, to warn the mother after the injured limb has been securely put up in a plaster case or in splints that she must herself look after the child, and see that the apparatus does not loosen, and, in the case of the leg, that the child is not placed in a high-chair and allowed to dangle its legs. In such a position the two fragments are very soon able to work upon each other with the hinge movement, which Hamilton has shown to be so common a cause of non-union after fracture.[1]

In some cases, too, I am afraid that the medical practitioner cannot be entirely acquitted of all blame. He should remember that it is his duty not only to fix the broken bone, but also to see that the two ends remain fixed. In a fat child and in a restless child it is often extremely difficult to maintain the two fragments in motionless apposition. He should therefore see the child more frequently than is usually necessary in a fracture occurring in an adult, and especially during the second week. A fat child who is confined to bed, or whose movements are restrained, wastes very rapidly, so that bandages or plaster-of-Paris cases, which were at first quite sufficient to render the fragments immovable, very soon require readjustment. This readjustment, however, must be done with discretion, since there is nothing so fatal to the satisfactory repair of a fracture as constant and needless meddling with the retentive apparatus.

In some cases, too, it would seem as if the surgeon went to the opposite extreme, and simply left the fracture to take care of itself; this mistake is most commonly made in connection with a broken collar-bone, and is, perhaps, one of the reasons why so many instances of non-union are recorded in this bone. Such an error in treatment is also made when a green-stick fracture of the humerus, of the radius, or of

[1] A Treatise on Fractures and Dislocations, London, 1884, pp. 284–288.

the ulna is treated by the simple application of a sling. The child is taken home, allowed to crawl about, and the green-stick fracture is very probably converted into an ordinary fracture before the surgeon again sees it.

Prof. Agnew[1] points out that in children the line of fracture is more often transverse than in adults. This point, if true, is of great interest, for it is obvious that it is much more difficult to keep the two ends of a transverse fracture in apposition, than one in which the fracture was oblique. In a transverse fracture the ends would either meet or they would not meet, whilst in an oblique one some part of the ends would be sure to overlap.

The treatment of fractures in children, then, resolves itself into the following common-sense rules: Diagnosticate the fracture as early as possible, and in every case keep the fragments in perfect apposition. After the fragments have been secured, see that the apposition is maintained by exercising careful supervision, and, when necessary, by the readjustment of the retention apparatus. As in cases of adults, so in children, the most successful treatment of fractures depends upon attention to details. In cases where non-union has occurred the prognosis in regard to subsequent union is very bad. In such cases the ends may be resected, and the fracture treated by securing perfect immobility of the bone for a long period. If, however, there has been much wasting of either end, it will, I think, be found that resection is useless. In the bones of the upper extremity the resulting fibrous union, judiciously aided by a light artificial support, will occasionally enable the patient to pass his life in tolerable comfort. Under similar circumstances in the lower extremity, however, it will often happen that amputation alone affords the patient relief from his miserable condition.

STREPTOCOCCUS OSTEOMYELITIS IN CHILDREN.

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of New York.

I. Etiology.

By Henry Koplik, M.D.

(Concluded from page 433.)

Animal Experiments.—The animal experiments with the streptococcus which was found in all the cases reported in this paper, were limited to the study of the effects upon white mice and rabbits. The effect of an injection of a pure culture in bouillon of the streptococcus

[1] Op. cit., vol. i., p. 946.

into the subcutaneous tissue at the base of the tail of the white mouse was that, after a few days, the animal invariably died. Death was preceded by symptoms of somnolence or dyspnœa; some of the animals presented a peculiar paresis in one or the other posterior extremity. The animals would drag the affected and relaxed extremity after them in running. This symptom appeared late. None of the joints in the paretic extremity were inflamed, so that I am not prepared to state the exact cause of this paresis. Autopsy upon the mice did not reveal anything but an enlarged spleen. Streptococci could be cultivated from the blood of the animal. It showed the same culture characteristics as the injected microbe. The organs (spleen and kidneys) showed, when hardened and stained, streptococci in masses, occluding the bloodvessels in various parts of the organ, especially in the pyramids, similar to what was seen in the rabbit. Streptococci were also found in the tufts and bloodvessels between the tubes of the cortex. There were no macroscopic pleurisies, peri- or endocarditis, or joint affections. The kidney epithelium was cloudy and swollen, as in the rabbit. The animals died of a species of septicæmia due to streptococci.

Rabbits. If a few minims of a bouillon culture of the streptococci were injected into the skin of the ear of a rabbit, nothing followed except an inflammation of the skin of the ear. The ear was thickened and red, the redness spreading toward the base of the organ; the ear hung over the head of the animal, but the general condition of the animal continued good after the first few days. The inflammation subsided without abscess, and the animal survived. Subcutaneous injection under the skin of the abdomen or back gave negative results. Injections into the skin around the joints gave negative results. Injections of pure cultures into the circulation gave invariable results. The bloodvessels along the borders of the ears were injected with a suspension of streptococci in bouillon, but after a few trials the spleen-tissue of the animals dying of such injection was rubbed in sterile bouillon, and the juice injected into the circulation of a healthy rabbit. The result was striking, and may be summed up as follows: Such animals after twelve hours were quite ill, refused food, crouched in a corner, did not move about, and evinced dyspnœa in shallow and rapid breathing. The posterior extremities in some animals seemed to be quite stiff; in some they were not moved even when the animal was urged to do so. They were held stiffly in contact with the abdomen, either both or singly. The joints in some of the animals—those corresponding to the shoulder, knee, small joints of the toes (claws)—became red, swollen, painful. In other animals there was no swelling, but when the joints were handled or pressed they seemed painful. The local wound at the point of injection, for the first few days became red; there was swelling and increase of local temperature. These symptoms spread over the whole ear, but

subsided after a few days, while the disease in the animal progressed; the animal died after a varying length of time as described in the histories. The autopsies upon these animals showed that the spleen was enlarged in all cases. The blood from the heart and spleen showed streptococci, which were cultivated pure. The most interesting macroscopic appearances were found in connection with the joints. The shoulder-joints, the knee-joints of the posterior extremities, the small joints of the paws were found in different cases swollen and filled with pus. This pus was creamy white, thick, and contained streptococci in pure culture. The heads of the bones making up such joints showed no gross change. The cartilages retained their original lustre, but in one case it seemed to have lost its normal gloss. There was no necrosis of bone nor subperiosteal swellings. The joints, which were not swollen but painful during life, showed when opened a thin, glairy, mucus-like substance, which adhered to the crucial ligaments in the knee. From this mucoid material (probably purulent) streptococci could be readily cultivated. The medulla of the bones corresponding to the inflamed joints was invaded with streptococci, which could be readily cultivated. The lungs, kidneys, spleen, and bones of the above animals were hardened and examined with reference to the presence of microörganisms.

Lungs: The lungs in some places were the seat of a broncho-pneumonia in minute areas. The walls of the medium-sized bronchi were infiltrated with small and large round cells, and the adjacent alveoli were filled with small and large round cells. Especial interest attached to the bacterial invasion. This was seen in the capillaries in the walls of the alveoli; the streptococci, in small masses and chains, seemed to be in the walls or on the inner surface of the bloodvessels. The vessels in the lungs were not plugged with streptococci, as seen elsewhere, but in the walls of the medium-sized bronchi large masses of streptococci existed, seemingly in the lymph spaces, also in the tissues of the lung. Minute chains of streptococci were seen between the endothelial cells of the alveoli, at times seeming as though in the cells themselves. It may have been that, being situated against the walls of a capillary bloodvessel, or in a lymph space, they shone through the cell and appeared as though situated in the body of the same.

Kidneys: The appearances in the kidneys resembled very closely those described by Babes in his work upon septicæmia in infants, and Baginsky in his report of autopsies upon cases of pyæmia in infants, similar to those of this paper. The bloodvessels of the kidneys, especially in the pyramidal portion, were found filled and plugged with masses of streptococci for considerable distances. In some places the bloodvessel presented simply a mass of micrococci, in other places separate chains were situated along the walls of the vessel. The vessels in the cortex which had been cut transversely were found plugged with strep-

tococci. The capillaries of the Malpighian tufts were also the seat of bacterial invasion. In the kidneys of the animals which had died of a species of marasmus with gradual emaciation, the bacteria were found more or less scattered in twos and threes, and in small chains here and there in the vessels. There appeared in these cases to have been produced a condition in which the bacterial thrombi had gradually broken down, and were washed away by the circulation. Those bacteria which were stained were all that had been left of an invasion *en masse*. These bacteria were with difficulty stained and easily decolorized. These things lead one to suppose that they might have been dead or inert. Streptococci could be seen in the uriniferous tubules in and between the cells. The epithelium of the tubules of the kidney was the seat of advanced degeneration. Whole tubules presented a cloudy appearance, the normal granulation of the kidney epithelium being absent. With picro-carmine stain the nucleus appeared as one red mass, broken up in some places into curious crescent forms or numerous irregular shapes. In other places the cell-body, devoid of nuclear stain, filled up the lumen of the uriniferous tubules in one cloudy mass. Irregular stains of small red particles here and there indicated nuclear remains. In the Malpighian tufts the endothelium of Bowman's capsule seemed to be piled up in layers of two or three cells thickness, topped by granular detritus, which did not stain, and pressed upon the bloodvessels. In short, the kidney presented extensive parenchymatous degenerations and bacterial invasion.

Spleen: The changes found in the spleen of the animals dying of injections of the above streptococcus were very constant and characteristic. The spleen in all animals was enlarged sometimes to four times its original bulk. It was quite firm and hardened well. In animals which had died with gradual emaciation the spleen was almost normal in size and appearance. Thin sections of spleen were stained with gentian-violet and picro-carmine. The invasion of streptococci was seen in the form of smaller or larger colonies scattered throughout the organ. Individual chains were seen among the cells of the pulp. The bloodvessels in places were plugged with streptococci. The most interesting changes found are those which, excepting the bacteria, correspond closely to what has been figured by Oertel as occurring in diphtheria. Throughout the spleen innumerable areas were found in a state of necrobiosis. They were best studied with fuchsin stain or simple hæmatoxylin. These were found scattered through the pulp areas, in the vicinity or the centre of which generally was a mass of streptococci (colony). Instead of the normal pulp of the spleen, there was found nothing but a mass of particles of most diverse shape; the small and large round cells seem to have disintegrated. Here are found most diverse pictures of spherical, semilunar, irregularly broken particles, which stain uniformly red

with fuchsin. There is little or no granulation to the structure of these particles. Then there are also large cells in which the nucleus is broken up into numerous particles of various shapes, or semilunar rings. These nuclear particles stain deeply, the cell-body very little, or not at all—its faint outlines alone can be seen. The streptococci are surrounded by granular detritus, the particles of which stain deeply and glisten when the focus of the immersion is brought upon them; between the necrobiotic cells we can see the spleen reticulum. On the outskirts of such an area a collection of irregular round cells, small and large, with irregular and deeply granular nuclei, can be seen. These areas are most numerous in the spleen, though they existed in the kidney also.

Bones: The changes found in the bones of rabbits which had died of streptococcus injection, and had also shown joint complication, were interesting. The medulla of the bone was completely invaded with streptococci; they were found in the bloodvessels and in small colonies studding the medulla, in the whole extent of the shaft of the bone, where it was not possible to say whether they were in the bloodvessels or not. Small and large chains were also found between the cells of the medulla. In the Haversian canals there were masses of chains and plugs of streptococci. In some of the bones at the junction of the epiphysis and diaphysis, the cartilage cells seemed to have become completely necrotic, the basement substance of the cartilage broken down; microscopic foci of tissue were found at such places which were necrotic. In the heads of the bones adjoining the affected joints, the cartilage cells appeared many to one capsule, some broken down; but it is difficult here to say what is inflammatory and what infarct. The cartilage basement substance was remarkably free from streptococci. In the cartilage so-called capsule near the cavity of the medulla the space around the cartilage cell showed what appeared to be small chains of streptococci. The cells of the medulla stained very badly, or not at all, with hæmatoxylin or picro-carmine. The whole tissue was uniformly hazy. Here and there were clusters of round cells stained with picro-carmine. The fat in places appeared in larger particles and greater clusters than we would expect to see in the normal tissue of the medulla. Nothing resembling a distinct sequestrum of bone was discovered in any specimen, though, as can readily be seen, the whole bone was the seat of active inflammatory changes. A piece of the trochanter major removed from Case I. at operation was found invaded with streptococci. The basement substance of the cartilage of the trochanter was fibrillated, had lost its homogeneous appearance, and minute areas made up of detritus and streptococci were seen. These areas adjoined the junction of the trochanter and the bone.

The radius, minus its epiphyses, which was removed entire from Case

III. at operation, was not destroyed for examination. Inspection of the bone at the upper end shows a worm-eaten appearance just below the neck of the bone; this is most apparent on the posterior aspect of the bone, and reaches as far as the mid-region; the medullary canal is exposed in places. The lower end adjoining the wrist is simply rough, but well preserved. There is no periosteum. There can be no question as to the process in question being osteomyelitis, and the specimen was preserved in its entirety for exhibition. Nothing further could be gleaned by microscopic examination.

Animals Experimented Upon.

Rabbit 1.—Injected in the skin of the ear with a pure culture in bouillon of streptococci obtained from Case II. In three days there was redness and swelling of the ear, spreading toward the root of the organ, with increased temperature; this redness subsided after a few days and the animal showed no other symptoms. The same animal was injected in the skin of the paws about the joints, and there was only a circumscribed local reaction.

Rabbit 2.—White, medium-sized animal, injected in the bloodvessels of the ear with a bouillon culture of streptococcus; this culture was only twenty-four hours old, and was transferred from agar. Animal died in twenty-four hours. Culture made from blood of heart and spleen pulp. The spleen pulp rubbed up in bouillon (sterile) injected into animal (4).

Autopsy showed very large spleen; streptococci in blood, nothing in joints, but a distinct redness of the head of the right femur, the acetabulum and ligamentum teres.

Rabbit 3.—Injected with a bouillon culture of streptococci obtained from Case I. The culture injected just as it was turning turbid (six hours old). Twenty-four hours after, the rabbit seemed quite ill. The ear at puncture was red and swollen; after forty-eight hours, he crouched in a corner and seemed unable to move. When laid on his back will remain this way with hind paws drawn up toward the abdomen. When he hops, he does so very awkwardly, the whole body being raised after him; hind paws are moved very little. Ear at puncture, red and swollen. This condition persisted for twenty-four hours. After four days the left hind leg is drawn up toward the abdomen; animal is very ill; he does not move about, and the swelling of the ear has spread toward the base; died on the morning of the sixth day.

Autopsy: Rigor mortis; heart and lungs show nothing abnormal, but there is a fibrinous peritonitis, with adhesions between the coils of intestine. There was no great amount of pus in any joint, but the cartilages of the heads of the bones in the knee-joint were covered with a thin membranous deposit like fibrin, or muco-pus. The same was seen in the hip-joint. This fibrinous glairy substance, taken from between the crucial ligaments, was found to contain streptococci. The medulla of the long bones contained streptococci, as did also the blood and spleen juice and peritoneal exudate.

Rabbit 4.—White and gray, medium-sized animal, injected with spleen juice in bouillon of rabbit (2). The injection was made directly into the bloodvessel of the ear. On the third day the animal appeared very ill and lay crouched in a corner. The left hind extremity is drawn up toward the abdomen; the animal does not move; is very irritable. Ear inflamed and swollen at the root. This animal died on the fourth day after injection.

Autopsy: Suppuration of the right knee; pus thick and creamy. Left knee full of purulent effusion; more serous than the right knee. Pus in the right shoulder-joint. Pus in the right hip-joint. Spleen very large. Blood of heart, spleen pulp, pus of the joints, and the medulla of the bones inoculated into agar tubes; streptococcus obtained. Pulp of spleen re-injected into large buck rabbit.

Rabbit 5.—Small, black animal, injected subcutaneously with a bouillon culture of streptococcus obtained from the pus of joint of Case I. This animal at no time subsequent to this injection showed any ill effects of the same; did not die of the injection; was killed after a few weeks; nothing found.

Rabbit 6.—Gray, active, medium-sized animal, injected into the vessels of the ear with *pus* obtained from Case II. After two days the rabbit was not very well. The injected ear red and swollen, especially at the base. This animal became very ill and on the twelfth day the ear was much swollen and painful; the animal did not eat or move much, and crouched stiffly in a corner; breathed in a shallow but rapid way. This animal, however, recovered from the immediate effects of his injection; was able to hop about, but emaciated gradually and died with symptoms of toxæmia.

Rabbit 7.—Lively large buck rabbit; injected with spleen juice in vessels of the ear; spleen taken from rabbit (4), Case II. Became very ill and died the fourth day after injection. The animal had shown marked local reaction around the puncture in the ear; he had crouched in one corner; refused food. When turned over was quite stiff; did not at first extend paws. After a few attempts, put himself right again. Breathing shallow and labored.

Autopsy: Heart and lungs negative; spleen enormous in size. The knee- and shoulder-joints are the seats of suppuration. Pus covers the crucial ligaments and heads of the bones. The right shoulder is distended with pus. The left shoulder contains a small amount of purulent serum. Culture in agar made from the blood, spleen juice, and pus in joints, and after twenty-four hours in thermostat the usual delicate streptococcus growth obtained.

Rabbit 8.—Medium-sized animal; injected into the ear with a pure culture in bouillon obtained from autopsy pus of rabbit (7); died upon third day after injection. Left knee contains small amount of pus; no pus in the other joints, no fluid in joints. Spleen enormous in size; no difficulty in obtaining pure cultures of streptococci from the pus in joint, also from the blood and spleen juice.

Rabbit 9.—Injected in bloodvessels of the ear with a pure culture in bouillon of streptococci obtained from rabbit (3), Case I.; death after four days. The ear of the animal was much swollen; the spleen was very large; no pus in the joints. The blood of the heart, spleen, and medulla of the bones showed abundance of streptococci.

Rabbits 10, 11, and 12 received injections into the circulation of pure culture of streptococci in bouillon obtained from pus of the hip-joint in Case I.

Rabbit 10.—Medium-sized, white animal; injected into the vessels of the ear, died after four days with usual symptoms.

Autopsy showed sero-fibrinous peritonitis, large spleen. There was no pus in the joints, but an excessive amount of serum in right knee-joint. Spleen was very large. Streptococci in blood, spleen, and medulla of bones, and above serum of the joint.

Rabbit 11.—Medium-sized, white animal; injected at the same time as rabbit 10, with same culture; died on the eighth day.

Autopsy: Injected ear livid and swollen. The animal's hind paws are both œdematous and swollen; several small joints in the paws much swollen, distended. In all, five toes of the ten were affected. The subcutaneous tissue very œdematous. The affected joints are filled with a thick creamy pus; a few inguinal glands swollen; knee-, hip-, and shoulder-joints showed no pus, though containing a little more than the normal amount of serum. Spleen very much enlarged. Pus from the above joints contained streptococci, as did also blood of the heart and spleen.

Rabbit 12.—This animal, of medium size, was injected with spleen pulp of animal (10), rubbed up in bouillon. The animal was quite ill for a time. The ear showed marked reaction. There was the same stiffness of the posterior extremities. The left hind leg seemed worse than the rest, and was not moved. These symptoms subsided; the animal became much emaciated; and though the ear swelling had disappeared and the animal hopped about, the emaciation progressed. The animal died after three and a half weeks.

Autopsy revealed signs of old peritonitis, a few adhesions being found. Both knees and both shoulders showed an excess of synovia. Spleen was normal in size. Nothing could be cultivated from blood, spleen, or joint synovia.

Mice.—A number of white mice, twelve in all, were injected as follows: (*a*) With pure bouillon cultures of streptococci obtained from pus of Cases I. and II. (*b*) With crude pus from Cases I. and II. (*c*) With spleen pulp, rubbed up in sterile bouillon, of animals dying from procedures *a* and *b*. In all cases the result was invariable; only one animal of the twelve survived. The mice after two or three days showed a peculiar paresis, in some cases in the hind legs. I am not prepared to state the cause of this symptom. The injections were all made in the usual vicinity, at the root of the tail.

Autopsies revealed a large spleen, and streptococci in the blood and various organs. I will not detail individual experiments, as they were all similar and the result the same as already stated.

When the above work was in progress I was not aware of the work accomplished in this same direction by the French school. The invariable occurrence of a streptococcus in pure culture in all four cases, and in these cases the subsequent appearance of bone necrosis, led to the inevitable supposition that we had to deal with an acute infectious osteomyelitis, secondary to the invasion of the bone by a streptococcus, which, as far as investigations show, is indentical in biological behavior with the streptococcus pyogenes. We had decided before the work of Lannelongue and Achard had agreeably confirmed our theories, that we had to deal with a variety of acute infectious osteomyelitis to which the infant organism was peculiarly susceptible, and which in its own sphere played a *rôle* exactly the counterpart of that played by the staphylococcus later in life. In reviewing the above work, we find two cases of joint suppuration and bone involvement after probable umbilical infection, one following a severe scarlet fever and one in which a successful result was attained; the osteomyelitis appeared during the full progress of a broncho-pneumonia with chest effusion. A portion of this effusion was withdrawn from the chest at the time; no microörganisms were found in the serum withdrawn, and its injection into mice was followed by negative results. This may have been due to the absence or scarcity of microörganisms in the portion withdrawn. Another specimen would have enlightened as to the nature of the effusion, but it was decided not to disturb the patient a second time. All the cases belong to the so-called septico-pyæmic class, and the most probable supposition in Case III. is that here the infection of the joints may have complicated a scarlet fever or a measles, in which the rash may not have been observed by the mother, or that we have to deal with a case following a pneumonia—a most likely complication. The animal experiments, performed as they were with a streptococcus common to and found alone in all of the cases, give us some interesting data. Not that we must insist that the animal and human disease are the same or peculiar to this streptococcus. Lannelongue and Achard have isolated streptococci

from diverse sources and obtained similar and more pronounced results. Löffler also injected streptococci of Fehleisen in a manner similar to that which he had pursued with his diphtheria streptococcus, and had produced similar joint suppurations. The streptococcus, and particularly the one isolated by others and myself in the above cases, is capable of producing in rabbits an acute infectious disease, and in some animals, not all, joint complications. French authors think that the amount of streptococci injected will tend toward yielding certain results, as necrosis of bone, if large quantities be injected. However this may be, there is no difficulty in establishing, in this acute infectious disease of rabbits as a result of streptococcus invasion, a distinct and characteristic response on the part of the bone tissue and joints. The regularity of this occurrence in these experiments leads me to suppose that the presence of streptococci in the structures of a bone are a menace to the integrity of the neighboring joints, and that, given streptococci in the bone marrow, an arthritis is almost certain to follow. We cannot explain the real nature of these cases by saying they are those of pyæmia. We must class the joints in the above experiments in the same category with the pleura, where we suppose an acute pneumonic empyema to result from a contiguous focus of involved lung tissue. No one will look upon the filtration of streptococci from the marrow tissue through the head of the bone by means of lymph channels as an improbable theory. Once in the joint the streptococcus creates a variety of accidents. The invasion of the whole organism *en masse* with streptococci is not necessary to the involvement of bones. A very small amount of infectious material may be arrested in any one bone and having been freed into the circulation from a streptococcus focus and lodging in a single bone, stop there. Such a bone might be involved to the exclusion of the rest of the osseous skeleton, as in Case III. Again, assuming that there was a continuous reception of minute and constant quantities of micro-organisms into the circulation, there might be produced an immunity of the organism against their action, except that in certain structures this immunity does not exist to a degree sufficient to prevent suppuration; the result is a monarticular suppuration, which, though it inconveniences the patient, leads to no necrosis, no destruction of the head of the bone. The adjacent bone may be the seat of active mycotic invasion, as in the animal experiments. These cases, I think, are osteomyelitic; their difference in severity from other cases may be accounted for by the presence of certain economic conditions which prevent multiple joint affections and general streptococcus destructive invasion. These monarticular joint suppurations are not simply catarrhal, nor do we explain by saying they are pyæmic. They are osteomyelitic, just as much as those joint suppurations in which wide destruction of bone tissue results. The monarticular joint suppurations, or those cases

where the joints at both bone extremities are involved, as in our case, must be classed with those severe and fatal cases in which many joints are involved and the patients die, both of exhaustion and toxæmia. They are all cases of osteomyelitis secondary to streptococcus invasion of the bone tissue. Such a streptococcus may have been present in the primary disease (scarlet fever, measles, diphtheria, etc.) as an accident—a so-called mixed infection. Once its invasion into the economy is inaugurated, we receive clinically pictures of greater or lesser severity, depending on laws to which the economy must conform in the presence of any infectious disease.

The favorable prognosis of the monarticular cases rather influenced most authors in discarding the possibility of an osteomyelitis as a causative factor. An osteomyelitis may, as any other infectious disease, be of various grades of severity. The German and French schools have shown that any portion of a bone, the epiphysis or the diaphysis, or both, may be the seat of disease. Any mycotic invasion of a bone or part of its structure is an osteomyelitis. It is not necessary in all cases of osteomyelitis to obtain foci of necrosis of bone. We can, as in the animal experiments, conceive of a stage of the disease in which, though an invasion of the bone marrow and bone tissue with streptococci is general and in active progress, necrosis is far from being one of the leading factors in the existing inflammation. These conditions must be explained in a great measure by the theories of the acquired and natural immunity of the human economy against disease. Some patients present to the invading organisms, whether in the vital fluids produced in the tissues or inherent in them (Virchow), or the serum of a circulating fluid, the blood (Buchner), or peculiar properties of the white blood-cells (Metschnikoff), peculiar phases differing in every individual. In this way a microörganism in one person may produce certain effects; in others it may stop short far from such effects. The virulence or the lack of this property in a streptococcus will not explain everything in connection with monarticular or multiarticular joint suppurations. Every microbe, virulent to a greater or less degree, must also meet in the economy complicated conditions favorable to its growth or tending to its limitation and destruction. Theories like the above always must have the fate of refutation and opposition, yet it seems the most plausible to offer, as being in accord with advanced knowledge and experiment. The acute suppurative arthritis of infants and children included in this paper is due to an acute infectious osteomyelitis. This osteomyelitis may be secondary to the infectious diseases (puerperal fever, scarlet fever, and exanthemata, diphtheria, pneumonia), and is due to a streptococcus for the present closely resembling the streptococcus pyogenes (or that isolated by Löffler in diphtheria). This osteomyelitis need not be accompanied by bone necrosis in the very mild cases, and

may be linked with or manifested by acute suppuration in one joint only. The bone and joint may in these cases be completely restored to the normal state. Two joints at both bone extremities may be involved with destruction of the intervening bone. Wide streptococcus invasion, gradual or rapid, may meet conditions in the organism favorable to the causation of destructive osteomyelitis in several bones, multiple suppurative arthritis, and gradual death of the patient, with symptoms of exhaustion and toxæmia.

NOTE. — The experimental work was performed in the Carnegie Laboratory, New York.

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II. The Surgical Treatment.

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The class of cases to which reference has been made in the first part of this paper is clinically so discouraging to the surgeon to whose lot their treatment falls, that it is not surprising to find many surgeons of the opinion that operative interference of any kind is hopeless from the first.

We have all of us seen these cases brought into the clinics with the marked pallor, the great prostration, the low fever indicative of septic intoxication, and the multiple joint abscesses, which stamp them from the first as beyond the reach of successful surgical treatment. And if we have been led by a sense of duty to fulfil the most obvious indications as to surgical interference, and have given exit to the pus in the affected joints, we have done so with a sense of the uselessness of the procedure, and in the face of a bad prognosis given to the parents of the child.

In the cases narrated in the first part of this paper it was my fortune to see the little patients in consultation from the first, and the treatment of the earlier cases was conducted upon general surgical principles, rather than founded upon any certain line of ideas based upon an intimate knowledge of the pathology of the conditions underlying the disease.

And had it not been that one of these cases was saved, as I believe, by an interference of a somewhat desperate nature, suggested by the laboratory experiments with the cultures from the former cases, and done with the aim to strike at the root of the evil, I should not have felt justified in presenting this subject.

It is understood from the facts brought out by my colleague in the first part of this paper that the cause of the disorder in all of these cases was the pyogenic streptococcus, which, from localizations in the bone marrow of the larger bones, produced the joint suppurations as secondary affections; so that we are enabled, in view of the pathological facts found, to specify the cases as cases of streptococcus osteomyelitis affecting the joints, instead of speaking of them simply as pyæmic.

This disease, streptococcus osteomyelitis, being as yet little studied, and, in fact, only mentioned in a very limited number of the most recent monographs—where, however, no reference is made to the treatment—I propose to invite your attention to some therapeutical considerations of the affection under discussion, made in accordance with our advanced knowledge of the pathology and etiology of this disease.

Before analyzing our cases with a view to improving the treatment of their entire class, it appears proper to differentiate the cases—on the one hand, from those cases of mild monarticular purulent or sero-purulent affections in relatively healthy children without apparent cause, together with the polyarticular suppurations after infectious and exanthematous diseases (such as diphtheria, scarlet fever, and the like); and, on the other hand, from the cases of osteomyelitis with or without accompanying joint affections, occurring in adults, which are so familiar to us in our clinics, and which are attributed to staphylococcus invasions.

There can be but little doubt that the last-named class of cases, as they appear in the literature and are observed in our hospitals and clinics, appear much less grave than the class of cases under discussion. This statement is borne out by the fact that a large number of authors (Demme, Chassaignac, Fischer, Koenig) are in favor of an expectant treatment of acute infectious osteomyelitis in the adult, until the time when the necrosed bone shall have become loosened by eliminating suppuration. Again, many writers (Rosenbach, Baumgarten), familiar with the different behavior in laboratory experiments of the two varieties of pyogenic germs mentioned, state that the clinical course of the diseases induced by the streptococcus is of a more grave character than those induced by the staphylococcus. These considerations, added to the clinical observation of our cases, give me an additional reason for urging a more radical and timely interference in all cases similar to ours.

As regards those cases of acute suppuration in one joint, occurring in children, which have been described by Volkmann under the name of

acute catarrh and blennorrhœa of the joint, there can be no doubt, in the face of our present knowledge of the etiology of the affection, that we have to deal with the identical disease under discussion; but with this difference—that the infection is much milder in form. In consequence of this, the clinical aspect of these two classes of cases is entirely different; and especially so should be the treatment.

In Volkmann's catarrhal inflammation of the joint, the child is in apparently good health throughout, and when brought to the surgeon does not appear to suffer from aught but a local trouble. The entire course of the disease is a more acute one; it is less insidious in its attack, and yields promptly to surgical interference of the simplest nature—simple incision into the joint and drainage with the use of suitable splints and antiseptic dressings (even without irrigation) being sufficient to restore good function of the joint. The only measure imperatively called for is the avoidance of delay, it being of great importance to make an early incision before the epiphyseal cartilages have been eroded and destroyed—although Rauchfuss has shown that in infants even these destructions are quickly repaired by the more active growth of these parts in children.

Much the same conditions are present in the suppurative joint affections after infectious diseases. In connection with this point I offer the following case:

B. L., five years of age, a native of the United States, had had measles some weeks previously; was brought to me with pain and swelling at the knee-joint. No precise history of the attack. For two days expectant treatment was adopted, a splint being applied. Then the skin over the joint having become red and inflamed, and the swelling not having diminished, aspiration of the joint was done, which revealed thick, creamy pus. An incision was immediately made over the point of greatest prominence, corresponding to the outer condyle of the tibia, a drainage-tube inserted, antiseptic dressings (creolin) and a splint applied. Under three changes of dressing the joint recovered perfect function. But at the site of incision the skin remained adherent to the bone. (October 7, 1891.)

If we compare the case just narrated as a representative case of the class formerly called catarrh of the joint, with the cases reported to-night, we observe that, clinically, there is little danger of confounding them. The general symptoms of fluid in the joint, it is true, are equally prominent in both classes of cases. But in the acute monarticular arthritis of children there is generally a history of a sudden commencement with a high fever and a chill, after which the only affection found is the swollen joint. In the cases under consideration, on the contrary, the fever has already been established, and the joint swelling has gradually appeared, often without even attracting the attention of the mother,

without so well marked pain, and without the sudden exacerbation of the fever.

The *monarticular* nature of the affection described by Volkmann as catarrh of the joint in children can hardly be brought forward as diagnostically important, since, in the class of cases under consideration, we may find only one joint affected at first. On the other hand, in the acute joint affections following the exanthemata and infectious diseases we frequently find two or more joints simultaneously affected.

Indeed, it appears from a study of the literature that we may have intermediate forms representing transitions between the two. But since these cases are generally not accompanied by pathological investigations of any kind, we have no other proof of the truth of this assertion than its probability.

The similarity of the etiology, both in the typical cases of the disorders referred to by Volkmann (Krause), and those following acute infectious diseases, such as diphtheria, scarlatina, measles (Löffler, Heubner, and Bahrdt), and those under discussion, has been established in the first part of this paper, and enables us to consider them as identical in nature. In order the more to distinguish between them, however, I shall, in this paper, speak of the so-called acute catarrh of the joint as the *mild* form, and of the other class as the *grave* form of streptococcus osteomyelitis (affecting the joints) in children.

We now turn to the consideration of the graver forms of osteomyelitis in children, due to streptococcus invasion.

Contrary to the generally accepted statements concerning osteomyelitis due to staphylococci, that it only attacks children in robust health, and then very acutely, the disease under consideration appears to affect only such children as have been recently exposed to some weakening influences, such as acute infectious diseases, or wounds and ulcerations of long standing.

The commencement of the disease is insidious, and the first thing noticed by the mother is the gradual development of symptoms of prostration and failing vitality. The child, if brought to the physician at this time, at once awakens solicitude. It lies quietly, pale, with sunken eyes surrounded by dark rims; its tongue coated, fuliginous; its skin dry; its temperature not very high, however. Occasionally its face is contorted, it utters sharp little cries, and when disturbed or touched, moves its limbs spasmodically, as if in great pain. Examination of the joints at this stage fails to reveal any local change, but whenever certain parts are touched corresponding to one or more bones with their neighboring joints, exaggerated expressions of suffering may be observed.

In the more advanced cases swellings of the joints are more pronounced, and have been seen by the mother. They have developed

gradually, and not until the child has been ill for some time. Diagnostic aspiration reveals thick pus or sero-purulent fluid.

In the course of the disease further joints generally become the seat of the same affection, and complications may appear at any time in the internal organs and the various synovial sacs.

According to the vitality of the child it succumbs sooner or later to the disease, the symptoms of prostration increasing, with failing pulse, inanition, and coma.

The diagnosis depends mainly upon the early establishment of joint suppuration, with the great prostration and "typhoid" condition.

Differentially we must bear in mind acute articular rheumatism, primary suppurative arthritis, acute tuberculous osteomyelitis (as described by Kiener and Poulet), and syphilitic joint affections.

The former are not characterized by such marked prostration, while the fever is generally much higher; but the syphilitic joint affections may easily simulate the disease under discussion, and in this connection I may refer to a case which I had the opportunity of observing in consultation with Dr. Koplik.

Male child, eight weeks old, was brought to the dispensary with painful swelling of the right elbow-joint, September 9, 1891. His mother had had syphilis, and had been under treatment for endometritis decidua. For the past week she had noticed the gradual development of the swelling at the elbow.

Status: The child appeared well developed; no fever. Sparsely distributed papulo-squamous syphilide present on arms, hands, palms, nates, thighs, legs, and soles of feet. Discoloration and sallow tint above eyebrows and alæ of nose. The elbow-joint was much swollen, painful; but the skin above it not reddened. There was no distinct fluctuation; the epiphyses of the bones forming the joint were enlarged. Attempted passive movements called forth manifestations of pain. No preternatural mobility.

Diagnosis: Congenital syphilis.

The treatment consisted in the administration of calomel (gr. ¼ t. i. d.) and iron (Wiederhofer's powders). The elbow was put on a suitable splint for two weeks. After three weeks the constitutional symptoms had disappeared and the elbow-joint appeared in every way normal.

Actinomycosis and glanders may also simulate the disease under discussion. But on account of the rarity of their occurrence in children I omit a comparison with them.

The treatment of the cases described in the first part of this paper was conducted, as mentioned above, on general surgical principles, at least at first.

As soon as a joint appeared swollen and painful, it was aspirated under strict aseptic precautions, and the fluid extracted examined. If it proved to be purulent, the joint was incised under antiseptic precautions, provided with drainage, antiseptically dressed and immobilized

by the use of splints, and kept elevated (this treatment being the same as that found effective in the milder forms of osteomyelitis mentioned above). The case was then observed. If, in the further course of the disease the drainage proved inadequate, or if the disorganization of the cartilages of the joint appeared progressive, further and more effective measures were adopted, consisting either in laying open the joint by wide incisions and counter-incisions (arthrotomy) with subsequent packing and immobilization, or else in arthrectomy or exsection of the joint.

Thus in Case I., of the female child, two weeks old, incision of the right knee was done (on the inner aspect) immediately after the aspirating-needle had revealed pus. The pus being of great consistency, the joint was also well washed out with a 1 per cent. creolin solution, and a drainage-tube left in. This was followed by apparent improvement. Nineteen days later the left knee was aspirated, but no pus being found, no operation was done. The hip-joint now being swollen and reddened, it was incised at the point of greatest prominence, internally to the femoral artery, and supplied with a drainage-tube. On the twenty-fifth day of observation the abscess from the costo-sternal joint was opened and drained. On the fifty-third day of observation, the joint cavities still secreting pus, and the disorganization of the cartilages progressing, the right knee was treated by arthrotomy and the left hip by exsection of the head of the femur; the left knee being partially excised. Creolin was used throughout for irrigation and dressing. The knees were packed with creolin gauze through the lateral incisions, and the cavity of the hip-joint supplied with a large drainage-tube. Extension splints were applied. The child was cared for at the New York Polyclinic Hospital. Death did not occur until two days after the operation. The delay in the final operative procedures was caused by a desire to employ conservative surgical measures.

In the second case, a girl of two years, the left wrist-joint was aspirated on the first day of observation, and all the swollen joints of the hand were promptly opened and drained. Six days later both elbow-joints appeared swollen. The right elbow-joint was incised and drained; but operation on the left one was deferred on account of the prostrated condition of the patient. This joint was opened seven days later and the patient died one day afterward. The delay in this case was caused by the apprehension that the patient, in her weak condition, could not stand further surgical interference, broncho-pneumonia and a complicating nephritis being present.

At the time when these two cases were first under treatment, they were entered upon my books as "septic arthritis," and spoken of as cases of "pyæmic joint affections." This diagnosis will show that at that time our attention was directed almost entirely to the joints themselves as the main seat of the affection, and as the proper object of therapeutic attack.

It is true, I was aware at that time of the theories (referred to at some length by Müller) that the infectious agents entered into the

joints from the medulla of the bones (Driessen) and the epiphyseal portions (Koenig), but I did not at that time imagine the foci in the bone to play so important a part in the disease as I was afterward led to conclude. And, in fact, there was absolutely no symptom present in our cases which could in any way lead the observer to suspect the diaphysis as the main seat of the disease.

But when, shortly afterward, I had the pleasure of witnessing the experiments on animals performed by Dr. Koplik, and examining the cultures and specimens emanating from these cases, my attention was more especially directed to the conditions present, in these cases, in the medulla of the bones. Here we find numerous and large foci representing pure cultures of the microörganism proved by experiment to be an etiological factor of the disease, located in the medulla proper and in the Haversian canals. As long as these foci are permitted to remain and to thrive and flourish, it is natural to suppose that the economy will be inundated by large amounts of ptomaïnes and toxines, and that to this fact is due the great weakness and prostration which presents so important a clinical feature in these cases.

What, then, appears simpler and promises a better hope of success in combating the disease than the removal of these foci as early and as thoroughly as possible? For in this manner we attack not only the cause of local trouble, but the breeding-place of systemic intoxication as well.

In looking back at the first two cases it is evident that the treatment of the first could be materially improved—provided nothing interfered with the carrying out of our intentions. Much might have been gained by cutting down on the bone of the femur and examining into its condition, with the view of determining whether the periosteum appeared loosened about the bone, and whether other symptoms of acute ostitis and suppuration of bone existed. Whenever two neighboring joints of the same limb are simultaneously affected, it is highly probable that the entire diaphysis is affected with an acute diffuse osteomyelitis. Could not, then, the entire diaphysis be removed, and at the same time both joints be evacuated, in order both to prevent the further necrosis of bone, and also prevent the poisoning by absorption, and the life of the patient thus saved?

Radical measures, in the acute stage, have frequently been proposed for necrosis of bone following osteomyelitis, especially in adults. All surgeons are familiar with the tenets of Chassaignac and others, who advised primary amputation in such cases, where the whole of the femur was attacked by acute osteomyelitis. But amputation, or exarticulation, at the hip is such a dangerous procedure in these conditions of pyogenic intoxication that, in consequence of bad results, the practice has been abandoned. Indeed, even the size of the wound alone in such a case

appears too serious a complication to be sought when it can possibly be avoided.

Again, Holmes, Ollier, and others have spoken in favor of early subperiosteal resection of the diaphysis or parts of the bone in acute osteomyelitis and periostitis. But, as far as my knowledge extends, such procedures have never been advised in the treatment of what has hitherto been called septic multiple arthritis, or pyæmia principally affecting the joints. And yet from the evidence brought forward in the first part of this paper such a course of proceeding does not seem inappropriate.

It was not until after such considerations had been called forth in our minds by the clinical course of the first two cases that the third case presented itself.

This, it will be remembered, was a girl, ten months old, who, when first seen, presented pneumonia involving the right, middle and lower lobes. There was at this time a fluctuating swelling of the wrist, extending somewhat up the forearm; the elbow-joint was also swollen, but not fluctuating. The wrist-joint, revealing pus on aspiration, was incised and drained, and antiseptic dressings and suitable splints were applied. Two days later the disorganization of the lower epiphyses of the bones of the forearm appeared to have increased in extent, and, therefore, an indication for further interference was considered to be given; yet, the temperature and pulse-rate being high (104° and 160, respectively), and much dyspnœa being present, owing to the pneumonia, such operative interference was postponed for fourteen days, when the patient had recovered from the effects of the lung complication. Then, there being more evidence of pus in the elbow-joints, both were opened with extensive incisions; necrosis was found at the epiphyses. Next, the radius was laid bare by a longitudinal incision—at first in its lower half—and it proved to be, as suspected, necrotic in its entire extent. It was, therefore, removed *in toto*. The wound was packed with creolin gauze and extension splints applied. The periosteal covering could not be recognized, with the exception of some shreds in the neighborhood of the elbow-joint, and its disappearance was attributed to the delay in the operation and the extension of the inflammatory process.

The condition of the patient being one of extreme prostration and weakness after the pneumonia, a bad prognosis was made at the time of the operation, which was done at my clinic at the New York Polyclinic. Nevertheless, the little patient made a rapid and good recovery.

At the time of dismissal from observation, some two or three weeks later, there was no evidence of a regeneration of the radius; and the firmness of the hand had been materially impaired by the loss of the radius, with the usual bowing of the forearm consequent upon radial shortening. I felt, however, that this was better than the loss of the entire forearm by amputation; nor could I escape the impression that the chances of recovery on the part of the patient had been materially improved by the substitution of the extirpation of the radius for the more formidable operation of amputation. Unfortunately, all trace of this little patient has been lost, as the address was mislaid, and the provision of a suitable apparatus for supporting the hand was, therefore, impossible.

I feel confident that, by paying greater attention to the diaphyses of the bones in cases of multiple septic arthritis of infants, we can do more to avert the fatal termination; and that a timely subperiosteal removal of the diaphysis, when two large joints of the same limb are affected, even if the limb should remain crippled, will be found more beneficial to the patient than other modes of treatment.

Especial stress, I contend, should be laid on the *early* interference. It is apparent from the laboratory experiments on animals referred to that, in the cases of the rabbits experimented upon, the joint suppuration was present at a time when only osteomyelitis in the medulla of the bone was found, but when no foci could be found in the epiphysis or head of the bone. It, therefore, appears probable that the arrosion of the cartilages represents a more advanced stage of the osteomyelitic inflammation, and that there is a time when, although both the diaphysis and the joint are affected, yet the epiphyseal cartilages still remain intact. If it were possible to take out the diaphysis at this time it would probably be possible to secure excellent results, complete regeneration of the diaphysis from the intact periosteum and complete restoration of the function of the joints, owing to the unimpaired condition of the epiphyseal cartilages, being the ultimate issue which we may properly expect.

Unfortunately, in practice the difficulties of diagnosis and the hesitancy on the part of the parents of the children will frequently interfere with an ideal conduct of the therapy in these cases. We should, however, not be deterred from making an exploratory incision down to the bones suspected of being the seat of the affection and examining thoroughly into the condition of the bone and its covering.

I am well aware, too, that in a certain number of cases, where diaphyses were removed *in toto* in the acute stages of osteomyelitis in adults, there was very little or no consecutive formation of new bone by the remaining periosteum. There are a number of such cases reported in our literature (Vogt).

It is, therefore, not impossible that this danger might threaten our little patients. As far as I know, however, no such case has been reported in children. But even in case the reproduction of bone should not take place as expected, I believe even this result would be more desirable than the danger to the child of exposure to the toxic influences emanating from osteomyelitic foci permitted to remain in the system. And in case a femur should have been removed in conformity with the treatment advocated above, and consequent reproduction of bone fail, a secondary amputation of the thigh, when the child has recovered its health, would certainly be a less dangerous operation than when done in its septic condition.

A further point of interest which requires our attention attaches to the condition of the epiphyseal cartilages.

Whenever primary subperiosteal extirpation of a bone in the acute stage of osteomyelitis in adults has been advised and practised (Holmes, Giraldès, Duplay, Thelen), it was considered a *sine qua non* that the epiphyses should be intact. If done, however, as in our third case, for an indication derived from the joint affections, it may happen that the epiphyseal cartilages are found extensively arroded or entirely destroyed, especially if the surgical interference has had to be delayed. In these cases the vital indication will still reign supreme, and we should not be deterred from endeavoring to save the life of the patient by the fear of crippling one limb.

Instead, however, of removing the entire osseous and cartilaginous structures at once and together with the necrosed diaphysis, I would propose rather to remove the arroded cartilages, or as much of them as is deemed necessary, by resection from the joint cavity, at the time of exploring and draining the joint. In this manner it may be possible to preserve a thin section of cartilage at the epiphyseal line, which, left in connection with the periosteal covering of the diaphysis, may insure more favorable conditions for the ultimate restitution of function.

The invasion of the central canal of the larger bones for the purpose of scraping out the medulla with sharp spoons and curettes (Sédillot, Keetly, *et al.*) is not easy of accomplishment in children, where the bones are small; nor could we expect it to hold out much promise of success when we bear in mind that the Haversian canals, which cannot be reached by this process, were found crowded with streptococci in the experiments, from which localization absorption of poisons into the system could still go on uninterruptedly.

The same consideration applies to the practice of trephining the bone (Ollier).

The presence of foci in the kidneys and other internal organs of the body may certainly present contra-indications to surgical interference of a severe character. When, from examinations of the urine, we find nephritis present, or complications existing in the lungs, pleuræ or pericardium, we may with propriety hesitate, in view of the more unfavorable prognosis, to resort to extreme measures in attacking the disease.

Thus, we read of cases of joint suppuration reported in our literature (*e. g.*, Baginski) where the infants were in so hopeless a condition, owing to complications in internal organs, that all interference could not but be regarded as utterly useless.

Nevertheless, the removal of every focus from which inundation of the system with ptomaïnes may continue, must represent a certain gain to the economy, and, therefore, an active reinforcement of the patient's strength. I, therefore, wish to advocate surgical interference *within reasonable limits*, whenever we may anticipate the establishment of more favorable conditions for the patient. Happily, the streptococci show such

a decided preference for localization in the joints that complications in other organs, if not far advanced, may retrograde, leaving the osteomyelitic foci the only menaces to life.

In conclusion, I offer the following considerations by way of recapitulation, and as therapeutic measures governing the conduct of the class of cases under discussion:

Since, in certain cases of acute suppurative joint affections, generally polyarticular, and occurring especially after distant wounds or inflammations of exposed surfaces, it is now established that we have to deal with an occult osteomyelitis involving the joints secondarily, but producing no clinical symptoms over the primary foci, and due to a streptococcus invasion of the system, I contend that these cases be considered as eminently surgical cases, and as proper objects for treatment in our surgical clinics.

Hitherto the pathology of these cases has not been fully recognized; they have been regarded in the light of septico-pyæmia, and have, from our present point of view, been neglected or inadequately treated. Not only the joint-cavities containing purulent effusions should be attacked, but the real foci of the disease situated in the bone-marrow of the neighboring bones as well, and these chiefly.

This attack should be made at as early a date as possible, so as to prevent a greater destruction of tissues than is unavoidable, and especially of the epiphyseal cartilages and of the periosteum.

For this reason active measures should be taken to examine into the condition of the bone by incisions along the shaft; and if the diaphysis appears partly or wholly necrotic, or if the periosteum appears loosened from it and inflamed, as much as is deemed necessary should be subperiosteally removed.

This resolve should not be influenced by the apprehension that subsequently adequate reproduction of the bone may not take place. If this should happen, the help of auxiliary apparatus must be invoked, and especially for shortening, or a secondary amputation done when the patient has regained his strength.

Nor should the fact that the epiphyseal cartilages have become arroded and disintegrated be allowed to interfere with the extraction of the foci of osteomyelitis, for it is of the first importance to remove from the system all hotbeds for the propagation of toxines. Only the diaphysis should, however, be removed through the longitudinal incision. The cartilages should be treated in conjunction with the joint.

The joints should, at the same time, be treated by free evacuation and drainage; if they be found completely disorganized, resection or arthrectomy should be done according to general surgical principles. As much as possible should be saved. Arroded or partially destroyed

cartilages should be treated by gouging, with preservation, if possible, of the epiphyseal line.

The technique, as well as the indications, will differ for the various joints.

Thus, for simple suppuration of the knee-joint in the graver forms of osteomyelitis, it will suffice to open the joint by longitudinal incisions on either side anteriorly to the lateral ligaments, the incisions also invading the large bursa under the quadriceps tendon.

For the hip-joint, however, the same affection will demand exsection of the head of the femur, because otherwise it is not possible to secure thorough drainage of the infected cavity.

The astragalo-crural articulation cannot be sufficiently drained after simple arthrotomy, so that partial excision of one or the other malleolus is indicated.

The shoulder-joint may be exsected for suppurative disorganization with more propriety in the adult, in order to prevent the ankylosis which would result after simple arthrotomy; but since in children interference with the epiphysis of the humerus means almost complete arrest of development of the bone, we may hesitate to do more than simple arthrotomy. Happily, the shoulder-joint appears to be less frequently attacked than the other joints. In most cases the elbow- and wrist-joints can likewise be sufficiently drained only after partial excisions, owing to their complex anatomical formation.

As to the smaller joints of the hand and foot, no general rules can be laid down; very rarely, I believe, will amputation be called for. Such smaller bones as are attacked may be taken out subperiosteally, if possible. If the joints cannot be properly drained, exsection is here indicated. The smaller foci, however, do not threaten the economy in the same measure as do the foci in larger bones, and oftentimes we see an attacked small bone recover from its inflammation without necrosis.

As to the choice of antiseptic methods and dressings in these operations little need be said. Active antisepsis is to be preferred to simple asepsis as affording more success in combating the septic processes we are attacking. Sublimate, carbolic acid, and especially iodoform, however, should be avoided in the cases of young children, as too readily leading to intoxication in their prostrated condition. Creolin, in 1 or 2 per cent. solutions, freshly prepared, has proved satisfactory to me in the cases here alluded to, especially when we cannot be certain of removing all the irrigating fluid from the joint-cavity.

REVIEWS.

A PRACTICAL TREATISE ON THE DISEASES OF WOMEN. By T. GAILLARD THOMAS, M.D., LL.D., Professor Emeritus of Diseases of Women in the College of Physicians and Surgeons; Consulting Surgeon to the New York State Woman's Hospital, etc. Sixth edition, enlarged and thoroughly revised by PAUL F. MUNDÉ, M.D., Professor of Gynecology at the New York Polyclinic, and at Dartmouth College; Gynecologist to Mt. Sinai Hospital, etc. Containing 347 engravings on wood. Pp. 826. Philadelphia: Lea Brothers & Co., 1891.

FEW literary experiments have been awaited with greater expectation by the medical public than the effort to revive the popularity of a book which once occupied a unique position in gynecological literature. We say "once," because its retirement as a text-book has been inevitable. The career of a successful work, like that of a successful individual, is often shaped by circumstances which to a superficial observer appear to be purely fortuitous; but in order that success may be permanent and not ephemeral, both must possess "staying" qualities.

The possibility of a successful literary partnership has been frequently demonstrated, notably in the case of the Edinburgh gynecologists. Partnership in revision is a doubtful experiment, comparable to that of putting new wine into old bottles. Such work, however skilfully performed, cannot but be uneven. Absolute harmonizing of old and new medical theories is impossible. To the iconoclastic spirit of the age "all things have become new." The delicate nature of the task undertaken by Dr. Mundé we thoroughly appreciate, and shall accordingly endeavor to bear constantly in mind the limitations necessarily imposed upon him, even though one would infer from the preface that he had *carte-blanche* to "change, omit, or add wherever he saw fit." If we interpreted this literally we would derive from his work an altogether erroneous idea of his progressive tendencies, which are well known. Still, when it is claimed that a book has been thoroughly rejuvenated the critic has the right to hold the reviser, as well as the author, responsible for the views as they stand.

In his modest preface Dr. Mundé indicates the scope of his revision, calling attention to the fact that with the exception of the introductory sketch of the history of gynecology "all the other chapters have been largely altered, and several entirely rewritten." This promise seems on a cursory inspection to be amply fulfilled, but a close comparison with the fifth edition, page by page, shows to our surprise and disappointment that there has not been that rigid exclusion of outworn ideas which we had a right to expect. The general chapters on etiology, pathology and therapeutics remain practically unchanged, except as regards modern operative technique—indeed we do not see how they could have been improved upon.

Chapter VI. on electricity is new, and though short, contains the gist of the matter, presented in the editor's usual clear and practical manner. The chapter on congenital malformations has an addition of four pages on hermaphrodism. A statement introduced on page 125 is an inexcusable anatomical error, pointed out long ago by Schroeder, viz., that the carunculæ myrtiformes are the remains of the hymen after rupture, instead of being always the result of the sloughing following parturition. We agree with him that there seems to be no reason for retaining the section on "hyperæsthesia vulvæ" as a distinct affection. The treatment advised for prolapse of the urethral mucous membrane (excision of the prolapsed portion) has been condemned by Dr. Emmet, who has shown that it does not effect a permanent cure.

The chapter on the anatomy of the perineum represents an attempt to adopt new ideas without wholly abandoning the old. The effort to reconcile discrepancies is not entirely successful: witness on page 168 the original expression "keystone of the arch," which has been so severely criticised in the past. Nowhere do we find any reference to the so-called "perineal body" as simply a part of the pelvic floor—a view much more rational, as well as more comprehensible to the student, than the one which assigns to it such an exaggerated importance. The expression "subinvolution of the perineum" recurs frequently as in the former edition. It is to be regretted that a supposed condition, not demonstrated anatomically, is assumed as a fact. The fallacy of this view is shown in the closing paragraphs of the chapter, which have not been altered. It is argued that incision of the perineum in a non-puerperal woman does not necessarily result in prolapse of the vaginal and rectal walls, because "subinvolution of the vagina and perineal body" does not follow, as after laceration during parturition. But no account whatever is taken of the more serious lesions of the pelvic floor which attend the latter, and which the scientific gynecologist cannot now ignore. Chapter XII., on perineorrhaphy, should follow this chapter. The intervening section on cystocele and rectocele has always seemed to us as unnecessary, since these conditions are usually simply complications, not independent affections. Figure 72 is an excellent representation of how Hegar's operation should *not* be performed, as the lower sutures are not buried. There is some unnecessary repetition in Chapter XII. We do not highly approve of the author's method of repairing a freshly-torn perineum, unless the tear is quite superficial. Figure 82 is inaccurate, as in the former edition; the upper suture does *not* "catch up the vaginal tissue at the highest point of the denudation." This is a most important point to be impressed upon the tyro, who might derive an erroneous idea of the operation from a study of the cut. The ancient plan of securing the sutures with a piece of rubber tubing was abandoned at least eight years ago by its originator. The old-fashioned purse-string operation for laceration through the sphincter is described and figured with few, if any, changes. The general reader will certainly infer that there has not been much progress in minor gynecological surgery during the past ten years, if he reads that this is still *the* operation for complete rupture. Dr. Emmet himself now takes the strongest ground against the circular suture, his results being much better with transverse ones, introduced the same as in closure of a vesico-vaginal fistula. The number of failures by the old operation was notorious.

Emmet's operation for colpocele is described, but so briefly that only an expert could grasp the idea. Figure 90 is far from being helpful, since it does not bring out the essential feature of the technique—that the lateral sutures lie entirely *within* the vagina, including *not* skin, but mucous membrane only. The description and illustrations of the flap-splitting operation are much more satisfactory.

Chapter XVI., on diseases of the urinary tract, the absence of which in the fifth edition was noticeable, is somewhat condensed, considering the importance of the subject. Diseases of the urethra receive a brief notice, no allusion being made to Emmet's unique plastic work. Acute and chronic cystitis are treated of together, which leads to some confusion. Ureteral disease is regarded as an anatomical curiosity. Few changes have been made in the chapters on fistulæ. Figure 117 is no improvement over figure 92 in the old book, the needle in the former cut being represented as abnormally delicate. Some attention should have been called to modern methods of avoiding the traction upon the edges of vesico-vaginal fistulæ by cicatricial bands, and the plastic operations resorted to in order to overcome this difficulty. The reader ought to understand that the treatment of such cases calls for more technical skill and experience than any other branch of minor gynecological surgery.

The pathology of endometritis has always been the battle-ground of authors. We have somewhat enlarged our views on this subject during the past decade. It is with some surprise, therefore, that we find so many etiological factors invoked in the causation of acute inflammation of the endometrium, when we have learned to believe that sepsis and specific infection play the principal part. We may properly ask, also, if no advance has been made in treatment, that we are still advised to rely upon warm poultices (changed only once in twelve hours!) and vaginal douches. The sharp distinction between chronic cervical and corporeal endometritis is still maintained, with their separate sets of causes and symptoms. The statement that "corporeal endometritis is a glandular disease" is not in accord with the teachings of modern uterine pathology. Hypertrophy of the mucous membrane (endometritis fungosa) is by far the most common variety. Hydrometra must be an extremely rare result of endometritis.

Chapter XXII. concludes with three pages in brackets by the reviser, in which he defines his own position with regard to intra-uterine medication, his opinions being somewhat at variance with those of the author. We are surprised at the omission by such a progressive writer of any reference to tamponade of the uterine cavity with gauze after divulsion, which is preferable to his "cylindrical wad of cotton covered with iodoformed vaseline," still more to the styptic cotton which he leaves within the uterus for twenty-four or forty-eight hours—a method of treatment which might result disastrously in less skilful hands than his.

And now for the famous chapter on "Areolar Hyperplasia," the *bête noire* of our student days! What can we say of it that has not already been said (or thought), except to express our disappointment that no visible change has been made? It remains still an ingenious attempt to exalt a mere "end-process" (to use a Teutonism) to the dignity of a disease, to expand a felicitous descriptive term into a pathological theory—with what success we leave to the judgment of a new generation of students. The old formidable list of symptoms is

retained, with the former necessary foot-note to this effect: "It must not be supposed that all these symptoms occur in all or even in the majority of cases. In many cases few, and in some almost none of them will be recognized." The present reader, like the reader of ten years ago, naturally wonders why so many are specified. On page 321 subinvolution is mentioned among the diseases (?) which are to be distinguished from areolar hyperplasia, while, on page 318, the former is said to be the most frequent cause of the latter—a contradiction which has always been confusing to students. One must conclude that the reviser has been just a little careless in his work here. "He will be most successful in the treatment of areolar hyperplasia," we still read on page 323, "who most assiduously searches for and cures these complicating conditions (laceration of the cervix, displacements, endometritis fungosa, and granular and cystic degeneration of the cervix) before addressing remedies to the main affection." The point at issue between the author and many of his *confrères* has always been that the latter are disposed to regard the "complicating condition" as the "main affection."

A separate chapter on uterine fungosities is unnecessary, and is calculated to continue the old erroneous idea that these products of hyperplastic endometritis are actual neoplasms. The definition, "fungous projections from the endometrium" is inaccurate and unscientific, as well as the statement that they may result from "organization of portions of placenta." We are surprised that this section, the incongruity of which was recognized by the author in his earlier edition, should have been allowed to stand unchanged. The illustration borrowed from Winckel (Fig. 153) and labelled "multiple adenoma, or so-called uterine fungosities" was never intended by that author to represent this condition. By reference to the original, it will be seen that it pictures a collection of retention-cysts obliterating the uterine cavity. The term adenoma is a peculiarly unfortunate synonym for endometritis fungosa, since it confuses simple hypertrophy with a true neoplasm.

In these days of rigid asepsis we have outgrown the old morbid fear of the sharp curette, and now recognize the fact that in order to thoroughly remove the diseased mucosa the dull wire instrument alone is often inadequate. The section on curetting is another disappointment to the surgical reader. There is no reference to contra-indications, to preliminary divulsion, to irrigation of the uterine cavity, the subsequent application of caustics, or the intra-uterine tampon. Surely a minor operation which is so universally performed, and which every practitioner ought to know how to perform carefully and thoroughly, deserves more than a scanty page, especially when Dr. Mundé has treated the subject so exhaustively in his own monograph on *Minor Surgical Gynecology*. We are instructed by him on page 344 after curetting to tampon the vagina thoroughly and also to "plug the uterine cavity with a cone of absorbent cotton saturated in compound tincture of iodine, which, with the vaginal tampons, is removed in forty-eight hours at the latest." We have never had occasion to resort to such safeguards after this simple operation, and would call attention to the fact that this method of after-treatment has been severely criticised by experienced gynecologists.

The chapter on laceration of the cervix bears ample internal evidence of that thorough revision which we expected it to receive at the

hands of one so familiar with the subject. Most of the illustrations are old familiar friends, but are not the less welcome.

In the five chapters on uterine displacements there is a commendable effort at modernizing, which is not always successful in places where an attempt is made to graft new ideas upon the old. It seems to be nearly time to abandon the position that anteversion *per se* gives rise to the symptoms assigned to it. Urinary symptoms are due to traction upon the vesical neck by the displaced cervix, not to "pressure of the fundus against the bladder," which could only occur in those exceedingly rare cases in which the fundus uteri is fixed—the existence of which is denied by Schultze. No discovery in this revised edition gives us a more disagreeable sensation of surprise than the finding of anteflexion pessaries and the erroneous anatomical explanation of their action. We had supposed that this was very ancient history indeed, not having seen the instruments in use for over ten years. Hart and Barbour have pointed out so clearly the fallacy of their supposed action that it is unnecessary to dwell upon the matter, except to express regret that they are still mentioned with approval. The reviser has indeed (page 415) ventured to damn them with faint praise, but his explanation of their inadequacy is far from being the true one—*i. e.*, that they do not elevate the anteverted organ, "owing to the want of a proper base or fulcrum from which to exert the upward force."

The paragraph in commendation of posterior section (page 421) is left unchanged, and will be read with no little interest by the thoughtful student of gynecology. In the revised edition one, of course, infers the substitution of "twenty" for "ten." Some would be inclined to believe that the "formidable wave of professional opinion," which in the former volume was represented as "steadily advancing in opposition to this operation," has not only reached, but has buried it.

In the section on retroversion pessaries the old leaven appears. Still are we told that there are two forces exerted through the instrument—one which "pushes the corpus uteri upward and forward," and another which "pushes the cervix upward and backward." This is hardly in accord with the results of subsequent observations, which have now made every medical student familiar with the elementary fact that a pessary acts in the same manner as the sacro-uterine ligaments—drawing the cervix backward and throwing the fundus forward.

The subject of fixation of the retro-displaced uterus, the opprobrium of gynecology, receives scant attention, considering its importance. The general reader will infer from the omission of any reference to palliative treatment that in this common condition there is no alternative between letting the patient alone and resorting to some more or less serious operation—a pessimistic attitude which, however much we may be inclined to entertain it ourselves, we ought not to teach, to the utter discouragement of the student. Here would have been an appropriate place to set forth the value of graduated pressure with the tampon, but one misses any allusion to this indispensable agent, except as hæmostatic (on page 67).

The chapter on inversion has always seemed to us too long, in that it deals with a rare condition, the various methods of treatment being of interest purely to the specialist.

One approaches the companion chapters on cellulitis and peritonitis with no small degree of expectation, in view of the radical changes

which have occurred in our pathological views. But there is no occasion for either curiosity or excitement, as no startling innovations are encountered. A latent suggestion of modification is contained in the prefix *para* (for peri) in the heading of Chapter XXXII., but that is all, except a vigorous, but sensible, protest against the views of some abdominal surgeons that pelvic cellulitis dees not exist at all. The dogmatic assertion on page 468 will not be generally accepted, viz.: "Pelvic peritonitis and pelvic cellulitis are, in fact, independent and entirely unassociated diseases, just as pleurisy of one part of the lung may occur at the same time with an inflammation of the substance of the lung at another point." This comparison (which is borrowed from the author, since it occurs in its original form on page 477) is an unfortunate one, although at first sight it appears quite apropos. As a matter of fact, these conditions so frequently associated in the thoracic cavity (in eighty-five per cent. of cases of pneumonia, according to Loomis) are not comparable to pelvic inflammations. The union between the cellular tissue and peritoneum is much more intimate, and an extensive independent inflammatory process in either is hardly imaginable. We do not deny the existence of a distinct primary cellulitis or peritonitis, but we simply deplore the weakness of the argument that "there is no reason why the cellular tissue of the pelvis should be free from the tendency to inflammatory exudation undeniably accorded to the same tissue in every other portion of the body."

Whatever may be the correct view with regard to the occurrence of cellulitis, one cannot now accept the statement on page 471 (retained as in the former edition), that non-puerperal cases are generally of traumatic origin, or that, as a rule, irritations inflicted upon the uterus below the internal os will result in pelvic cellulitis, above that point in pelvic peritonitis. No such forcing of pathological facts into correspondence with theories is acceptable to the present generation of readers. It has been demonstrated beyond a doubt that in all the fatal cases of trachelorrhaphy, posterior section, and other minor operations upon the cervix uteri, death was due to septic infection transmitted, not to the cellular tissue, but along the endometrium, through the tubes to the peritoneal cavity. With cases in which no autopsy was made we have nothing to do. There is no legitimate basis for a pathological theory except the anatomical. With regard to the differential diagnosis between cellulitis and peritonitis we must still be content with the meagre information that in the latter "a small tumor may be discovered, but it is usually posterior to the uterus, and not on one side of it." And again: "The uterus is rather more movable than in cellulitis, especially from above downward." Now that we regard fever purely as a symptom of septic infection, the statement that in acute peritonitis death may be due to high temperature, and that if the thermometer registers 102° F. one must resort to vigorous antipyretic measures, is apt to be misleading, diverting the attention of the practitioner from the main issue.

We are led to inquire, on reading the caption "Treatment of Chronic Cases," What *is* chronic peritonitis? Following the misleading nomenclature of the past, one would infer that a progressive inflammatory process was implied. In reality, we mean simply the peri-uterine adhesions which represent the result of former inflammation. The acute exacerbations to which allusion is made are simply fresh attacks of peritonitis, due, as we now all admit, to fresh infection from diseased tubes.

If this is the case, it may be pertinently asked: What permanent benefit can be expected from simply evacuating pus in such a case of "chronic peritonitis" while the septic focus remains?

On page 495 the importance of distinguishing between intra- and extra-peritoneal collections of pus is emphasized, but the extreme difficulty in making the distinction is not shown. To the means advocated for closing an old abscess-cavity we would add peroxide of hydrogen, a more valuable agent than any mentioned. Curetting the sac, thorough irrigation, injection of peroxide and tamponing with iodoform gauze sometimes succeed in the most obstinate cases.

To the chapter on pelvic hæmatocele we must file several objections, which lack of space does not permit us to present in detail. The list of etiological factors is as long as ever. Some of these are now recognized to be purely theoretical. Who has ever opened the abdomen for hæmatocele and discovered and tied at the operating-table a ruptured vein or artery in the broad ligament which was the source of the hemorrhage? Who has discovered such a condition at an autopsy? From a practical standpoint the gynecologist has nothing to do with hypothetical causes. Hemorrhage from the ovary and from rupture of an ectopic sac, especially the latter, are now known to be by far the most common causes. The astonishing frequency of the latter condition and its relation to both intra- and extra-peritoneal effusions of blood, the importance of differentiating the two varieties, and the indications for prompt surgical treatment—these are the burning questions of the day, and the ones of more interest to the practitioner than almost any other subject in gynecology. The gist of the modern treatment is contained in the bracketed comments.

The chapters on fibroid tumors have been carefully revised and brought up to date; the sections on surgical treatment are judicious and conservative, allusion being made to total extirpation of the fibroid uterus, an operation which has been demonstrated by Chrobak to have a future.

The attempt made to place the section on adenoma upon a better pathological basis is not entirely successful, since it is again confounded with hyperplastic endometritis. "Villous endometritis" is a misnomer. There is only one true adenomatous neoplasm, the *adenoma malignum* of Schroeder, which, as well as sarcoma, should be treated by total extirpation of the uterus just as soon as the diagnosis has been made, provided that there are no positive contra-indications. We cannot assent to the statement that "the same treatment (curetting) applies to both the minor and the major varieties of the disease," *i. e.*, to malignant adenoma and villous endometritis.

The pathology of the chapter on cancer of the uterus was rather severely criticised by a former reviewer. It has undergone some changes, but the division into epithelioma, encephaloid, and scirrhus is still retained, with the former foot-note, that clinically they are often found combined in a single specimen. We regret that the student is still confused with an attempted clinical distinction between the three forms, which can be of no practical use to him. The term scirrhous appears to be used in one place to describe clinical, in another microscopical peculiarities.

It is somewhat discouraging to find that in the past ten years we have not learned to detect any more accurately the initial symptoms of can-

cer of the uterus, and that it is only after ulceration occurs that an experienced examiner is able to make a positive diagnosis. If this were strictly true the brilliant results already obtained from radical operations would be inexplicable, since they depend for their success upon early diagnosis. It is highly important that the general practitioner should learn to recognize the disease in its incipiency and not simply at the inoperable stage. We are not so pessimistic as to believe that this may not be attained.

The sections on the disorders of menstruation are capable of condensation. There is no advantage in describing menorrhagia, metrorrhagia, dysmenorrhœa, etc., as if they were distinct affections instead of being mere symptoms. The chapter on leucorrhœa in the former edition has been wisely omitted, and the following one, on sterility, appears much improved in its proper position at the end of the volume. Chapter XLV. in the old book, a stray waif, bearing no relation to that which preceded or followed it, has also disappeared.

The subject of diseases and neoplasms of the ovaries (pp. 636–751) has been carefully worked over, and, as a whole, calls for little criticism. A few minor exceptions may be taken. Attention should be called to the fact that acute non-puerperal oöphoritis occurs independently of disease of the tubes, recent observations having demonstrated the fact of the direct transmission of septic infection from the uterus to the ovaries, through the medium of the lymphatics. We cannot now properly affirm that "the symptoms of this affection are so intimately associated with those of peritonitis and cellulitis that it is impossible to separate them." An eminent authority on this subject (Slavjansky) takes a contrary view, which is held by others. The pain, if not absolutely characteristic, is certainly of a different type from that attending ordinary peri-uterine inflammation. Abscess of the ovary would naturally be discussed under the head of acute oöphoritis instead of in a separate section. We are glad to note that chronic oöphoritis is regarded, not as a chronic inflammatory process, but as simply a hyperplasia, the result of repeated congestions or former inflammation. On page 658 the belief is still expressed that utero-gestation is a desirable condition, because it "secures the ovaries from monthly congestions for nine months." This is not entirely consistent with the opinions expressed on page 43, and is a view by no means universally entertained. The pessimistic views formerly entertained by the author with regard to the treatment of chronic disease of the ovaries have been somewhat modified, but are still calculated to discourage the non-surgical reader. They are certainly candid, and doubtless most of us would subscribe to them if we were as honest.

Chapter XLIII., on ovarian cysts, is excellent. We do not agree with the writers regarding their idea of an explorative incision. When a cyst is emptied (as described on page 707) the operation certainly exceeds the limits of a mere exploration.

The chapter on diseases of the tubes is a good index of the progress made in our knowledge of these affections. The explanation of the origin of hæmato-salpinx as due to "the regular monthly discharge of blood from the tubal mucous membrane" is purely theoretical. Excluding cases of atresia of the genital tract, the most common cause is doubtless tubal gestation. Pure hæmato-salpinx is very rare and is usually secondary to hydrosalpinx, just as many cases of so-called hæma-

toma of the ovary are simply the result of hemorrhage into a preëxisting cyst; the sanguineous effusion under these circumstances is rarely sudden, nor would we expect acute symptoms. Drainage of a pyosalpinx per vaginam is certainly deserving of attention, although it has been severely condemned by some abdominal surgeons. It does credit to the reviser that he is not afraid to express unpopular conservative views when he feels justified in doing so.

Considering the importance recently assumed by the subject of extra-uterine pregnancy and its voluminous literature, one cannot help thinking that Chapter XLVII. is susceptible of still further improvement. The denial of Veit's statement (made fourteen years ago) that "about one-fifth of all cases of hæmatocele are due to the rupture of tubal pregnancies, and that recoveries occur under these circumstances much more commonly than is generally supposed," is surprising in the face of accumulated evidence, which proves that the proportion is much higher. Surely some concession should be made to our increased knowledge of the pathology of this condition, the frequency of which is attested by every society report, not to speak of the numerous monographs which have appeared during the past five years. The symptomatology is not clear and concise, in fact it relates only to the recognition of the condition *after* rupture, whereas prominence is given to its treatment before this has occurred. Variation in the ordinary type of menstruation, the peculiar colicky (not "dull, grinding") character of the pain, the passage of decidual membrane—these symptoms, which it is so important to impress upon the general practitioner, are not emphasized as they should be. The section on prognosis should be modified to accord with more recent experience.

It may be regarded as unfair in a reviewer to criticise the old, as well as the new, portions of a book, yet we hold that in a revised edition of an important work the profession have a right to subject it as a whole to the tests of modern science. It should be assumed that it is fully abreast of the times, and that it represents the present views of both the author and the reviser. Recognizing the delicate and difficult nature of Dr. Mundé's task, which he has doubtless discharged as well as any other American gynecologist could have done, we feel that we would have been wanting in candor, as well as in fairness, had we not called attention to such errors as met our attention in a somewhat careful study of this work. Many of these we are inclined to believe were due to haste, others may have been unavoidable from the peculiar position in which he was placed. An essential change in the plan of the treatise we did not expect. Had such a radical transformation been attempted, it would no longer have been the brilliant and attractive work of our student-days—it would not have been Thomas's book. Unquestionably it has been much improved, and great credit is accordingly due to both the author and the reviser. While much that detracted from its unity has been omitted, one regrets that it has not been condensed and strengthened by the omission of useless references to worn-out beliefs. We predict that in the text-book on gynecology of the future fewer diseases will be described—many which are now treated as if they were distinct affections being assigned to their true place as mere symptoms or complications. There will be no lengthy discussions on moot points in pathology. Theories will give place to facts. Such a book will be not

merely a mirror of its author's practice, but an epitome of the collected wisdom of the age.

The smoothness of the work is marred by the frequent interpolation of parenthetical references to cases and specimens, with which the special reader is more or less familiar. We trust that we are understood in our criticism of this feature—purely as a literary blemish. The student and general practitioner who seek for incisive, dogmatic statements will only be confused by these numerous excerpts from case-books, which are all right in their proper place, *i. e.*, in a journal article. It is impossible to prophesy exactly what niche this volume in its new dress will fill in gynecological literature. That it will ever regain its former exalted position as a text-book is impossible, though it will always be valuable for reference. *Tempora mutantur et nos in illis mutamur!* Gynecology now rests upon a purely anatomical basis. Every theory, every method of treatment is rigidly tested by the standard of anatomical facts. The prevailing critical spirit is so keen that it is impossible for a writer to conceal flaws in his arguments beneath either the shadow of his personal reputation or the charms of his literary style. Glittering generalities find no place in the present system of medical instruction. The excellent manual of the two Edinburgh gynecologists owes its permanent popularity to this very change in the attitude of medical students and teachers—certainly not to either its literary excellence or to its subject-matter, which is condensed almost to the point of obscurity. It is professedly an exponent of pelvic anatomy as applied to the treatment of diseases of women; it makes no pretensions, but at every step appeals to *facts*. Whatever may be the future of the last edition of Thomas's *Diseases of Women*, one thing is certain—it will always remain a lasting monument to the energy of one of the most finished medical writers and brilliant and successful teachers of the century, their obligation to whom is gratefully acknowledged by hundreds of practitioners. Books and men grow old rapidly in this rushing age. There is not even a survival of the fittest; there is no survival at all. Another decade will see vast changes in the science and art of gynecology; the younger generation will, as they do now, criticise complacently the errors of their elders, but they will doubtless do well to remember that "there were giants in those days." H. C. C.

CLINICAL MANUAL FOR THE STUDY OF MEDICAL CASES. Edited by JAMES FINLAYSON, M.D., Lecturer on Clinical Medicine in the Glasgow Western Infirmary; Physician to the Glasgow Western Infirmary and to the Royal Hospital for Sick Children; Honorary Librarian to the Faculty of Physicians and Surgeons, Glasgow, etc. Third edition. London: Smith, Elder & Co., 1891.

THE manual is written especially from the standpoint of the clinician, and the authors follow closely throughout the work the idea of stating facts in such a manner that aid will be given the reader in the actual study of cases. Therapeutic measures are not considered; the book is one of differential diagnosis and symptomatology, and gives in a brief and clear manner the usual significance which attends physical signs

and symptoms, subjective and objective, as well as the method to be followed in order to arrive at a differential diagnosis. Throughout the manual numerous tables are given which afford a ready means of assistance in differentiating allied or similarly appearing diseases.

Special stress is laid upon etiology. The point is made, for instance, in neuralgia of not labelling a pain neuralgic when the involvement of the nerve may be secondary to some definite disease either general or local, as anæmia, malaria, or a wounded nerve.

The author, in considering a symptom, as lividity or duskiness in dyspnœa, page 351, describes first its usual sites, then its causation, and, finally, in a clear and concise manner, its connection with and significance in various diseased conditions; but no exhaustive recital or minute description of the various diseases with which dyspnœa is associated is attempted. In the same manner the clinical significance, for instance of paralysis in the various forms in which it appears—hemiplegia, paraplegia, monoplegia, lead palsy, etc.—is clearly pointed out.

The chapter on the "Physiognomy of Disease," contributed by W. T. Gairdner, M.D., LL.D., is of special interest to the practitioner; the various cachexiæ, syphilitic, rickety, dropsical, gouty, strumous, etc., are considered. In those diseases in which the mental functions are impaired, it is shown that almost every distinct type of insane aberration has its peculiar physiognomy; while in infancy and early childhood the author claims, and with what to us seems good reason, that unless in the case of positive physical signs directly bearing on the state of the internal organs, the physiognomony of disease in children constitutes by far the most important aspect of diagnosis.

Chapter III., on "Temperature, Pulse, General Signs of Pyrexia," contains numerous temperature charts which are of interest, also tracings showing the influence of respiration on the pulse in healthy and diseased conditions. The point insisted upon of retaining the thermometer in position until the mercury maintains the same level for about three minutes, seems to us to be, while perhaps occasionally required, often disadvantageous to the patient and uncalled for. In all febrile conditions any position if insisted upon quickly becomes irksome, and in children is often followed by a varying interval of unrest and disquietude.

In a book which is edited by such an able clinician as Dr. Finlayson, we naturally turn with interest to Chapter IX., which is devoted to "Disorders of the Respiratory and Circulatory Systems." The author here shows at his best. Various symptoms, as dyspnœa, orthopnœa, palpitation, angina pectoris, Cheyne-Stokes respiration, cough, expectoration, and hæmoptysis, are carefully considered from a clinical standpoint, and their significance both as regards their diagnostic and prognostic importance is clearly and briefly explained. The portion of this chapter devoted to the microscopical examination of sputum, with the carefully selected methods and definite information given in regard to the different methods of staining, will be of special value to the ordinary American third-year student; while the importance of the use of the hæmoglobinometer and hæmacytometer for the purpose of diagnosis, prognosis, and treatment, which is so often largely neglected in many modern textbooks, is considered in detail.

The "Derangement of the Digestive Functions," in diseases of a general nature as well as in local affections of the digestive organs themselves,

is discussed in Chapter XI. Special attention is paid to the complexity in the etiology of digestive disorders, and the consequent necessity of a careful investigation of the different groups of symptoms in respect to duration, proximate cause, association, and relative date of the symptom in question. The macroscopical and microscopical examination of vomited matters is considered in a practical and condensed manner, as is also the significance of the appearance of the stools as regards color, presence or absence of mucus, blood, and pus. The value of the microscopic examination in this connection is pointed out.

The last hundred pages, Chapter XVI., are taken up with "The Physical Examination of the Chest and Abdomen." The portion devoted to sounds of the heart, normal and abnormal, is profusely illustrated with drawings, sphygmographic and cardiographic tracings. This portion of the work has been prepared with more care and regard for minute details than any other portion of the manual, and will be more interesting to the scientific physician than to the daily practitioner.

We note with regret that the book before us does not contain the chapter devoted to post-mortem examinations which appeared in the earlier edition, and its omission is a positive loss to the medical student, fer whom the manual is largely intended. The importance of the knowledge derived from this method of research is too apt to be neglected, and the chapter contained information of positive value to every student of medicine. E. E. G.

DISEASES OF THE SKIN. A MANUAL FOR PRACTITIONERS AND STUDENTS. By W. ALLAN JAMIESON, M.D., F.R.C.P. Edin., Extra Physician for Diseases of the Skin, Edinburgh Royal Infirmary, etc. Third edition, revised and enlarged. With woodcuts and nine colored illustrations. Philadelphia: Lea Brothers & Co., 1892.

THE first edition of this treatise appeared in the year 1888, and met with deserved favor. The author had, for some time before, commended himself to American practitioners and students interested in cutaneous medicine by his painstaking work in connection with the general subject. He had long collated for the Edinburgh medical press the work of the leading experts of the continent of Europe in the department of dermatology. He was thus well prepared to write, not from the possibly limited experience of a practitioner in a town of scarcely more than three hundred thousand inhabitants, but with some observation of a wider field.

The present edition is improved by revision, evidently made in many parts with care, as also by the new material added on the subjects of dermatitis herpetiformis (where it is gratifying to note that the long years of labor of our own Duhring have at last received just recognition), of pityriasis maculata, of lymphangioma circumscriptum, of pityriasis rubra pilaris, of xanthoma diabeticorum, and of lepra.

Considering the relative frequency and importance of recognition of the pityriasis rosea of Gilbert, or, as Americans term it, pityriasis maculata et circinata, it is surprising that in so voluminous a work as the present our author has not thought fit to devote to it more space than

a scant page. One is, indeed, here led to suspect that it has been recognized less often in Scotland than in other countries. Jamieson scarcely seems to be aware that this affection actually belongs to the class of exanthematous fevers, since one may often detect with the thermometer, in the subject of the malady, febrile temperatures. Its somewhat prolonged, if not complicated and formidable, phenomena occur in a cycle, almost invariably accompanied by a feeling of languor and malaise on the part of the patient, in whose case, apart from the moderate pruritus awakened, the systemic symptoms are often those most significant. We find, moreover, in these few lines no naming of the distinctly fawn-colored or "mackerel-tinted" shade, giving the oval or circular patches such a striking physical peculiarity that, once recognized, they can scarcely be mistaken for patches of psoriasis, or those of syphilis, between whose symptoms and those of pityriasis rosea our author establishes a scarcely needed distinction. The malady must be better known among Englishmen, for Crocker, in his treatise of nearly similar size, devotes about four times as much space to its consideration in an exceedingly lucid sketch of its symptoms.

Perhaps we may forgive our author for slighting to a similar degree the much vexed question of pityriasis rubra pilaris and its relations to the lichen ruber of some American and some German contributors. In a trifle more than a couple of pages are here discussed the conditions which have brought those pens into requisition, which, after such great toil, have actually established such a very moderate number of facts. Taylor's well-illustrated report of cases published under the distinctive title of "lichen ruber" is here cited as illustrative of a well-marked pityriasis rubra pilaris, a view expressed in the controversial paper on the subject by Hans Hebra, but one which will scarcely please the American author, nor, indeed, be readily accepted by those who have had the opportunity of carefully studying the Baretta models of the last-named disease in the collection of the St. Louis Hospital. The truth is, Jamieson has done his readers some service in sparing them the details of a controversy which is yet not satisfactorily concluded, but which may perhaps be decided in the future with the establishment of distinctions which at the present day are not accepted in the French school.

Dr. Jamieson's treatise is really a useful, instructive, and valuable contribution to the bookshelves of the practitioner and the student. It is not, rigorously estimated, one which falls into line with the standard treatises in any department of medicine. These only meet modern requirements if they be terse, rigidly systematic, comprehensive, and of cyclopædic quality for purposes of reference. The work before us is not of such an order. It is distended with reports of cases for the most part illustrating admirably the themes discussed, but which impart to the whole the features of a clinical essay. Indeed, the author has, to a marked degree, the style which once made popular the writings of Watson, Paget, and other contemporary contributors to British medical literature. It has a charm of its own; and one reads its lines with a zest that cannot be imparted by the details of a digest, or by the paragraphs of a reference handbook. It is chiefly to be criticised, from an American point of view, for the unrestraint with which, as is common with so many of his countrymen, are given the names, street-numbers, and places of business of certain dealers in articles advised for the management of cutaneous disease, such persons being presumably finan-

cially benefited by this sort of advertising. Even a few enterprising American tradesmen do not go here unrewarded.

The treatise is to be commended as an excellent work for reading in connection with systematic study of the subjects discussed.

J. N. H.

MANUAL OF PHYSICAL DIAGNOSIS, FOR THE USE OF STUDENTS AND PHYSICIANS. By JAMES TYSON, M.D., Professor of Clinical Medicine in the University of Pennsylvania and Physician to the University Hospital; Fellow of the College of Physicians of Philadelphia; Member of the Association of American Physicians, etc. Pp. 136. Philadelphia: P. Blakiston, Son & Co., 1891.

THERE are so many excellent manuals of Physical Diagnosis that the only good reason for adding to the number is that every teacher feels the need of a book which exactly corresponds to the individuality of his methods. The present volume is by a clinical teacher of much experience and a practitioner of well-known ability, so that his work has a value outside of a class of undergraduates. The scope is limited. Except thoracic aneurism the only diseased conditions considered are those of the lungs and the heart; therefore, it would be advisable either to limit the title or to consider the physical exploration of kidney, liver, spleen, and stomach. The diseases of these organs fall within the province of the ordinary practitioner.

The author approaches his subject from a practical point of view, and the little work will prove a good friend to the student. A part of its value comes from its inexpensive make up. G. E. S.

CONSUMPTION: HOW TO PREVENT IT AND HOW TO LIVE WITH IT. ITS NATURE, ITS CAUSES, ITS PREVENTION, AND THE MODE OF LIFE, CLIMATE, EXERCISE, FOOD, AND CLOTHING NECESSARY FOR ITS CURE. By N. S. DAVIS, JR., A.M., M.D., Professor of Principles and Practice of Medicine, Chicago Medical College; Physician to Mercy Hospital, etc. 12mo., pp. viii, 143. Philadelphia and London: F. A. Davis, 1891.

TUBERCULOSIS AND ITS SUCCESSFUL TREATMENT. By ROBERT BELL, M.D., F.R.P.S., etc. Medical Referee for the National Hospital for Consumption, Ventnor; Senior Physician to the Glasgow Hospital for Diseases Peculiar to Women; Vice-President of the British Gynecological Society, etc. 12mo., pp. 60. Glasgow: David Bryce & Son, 1892.

THE little book of Dr. Davis is timely and useful. If we except Richardson's great works on *The Field of Disease* and *The Common Health*, no popular essay so useful has appeared in the English language since Beddoes' publications on *The Prevention of Disease*, a hundred years ago.

In a concise, lucid, and thorough manner the author sets forth the principal elements of the prophylaxis and hygienic management of pulmonary tuberculosis. We do not entirely agree with him in details, but the points of difference are not all of major importance. In the

matter of diet we would lay greater stress upon the necessity for nitrogenous food, and would make less use of carbohydrates.

The book grew out of the difficulty the author had experienced in impressing upon consumptives, in necessarily brief conversation, the necessity of rigidly executing these sanitary rules, the fulfilment of which is so essential to successful treatment. He, therefore, prepared a series of written rules and a brief explanation of the effect of their execution. From these the book has grown.

Physicians will do their patients a service by placing this book in their hands. In no other way can fitting acknowledgment be made of the great obligation under which the author has placed the profession and the community by writing it.

The object of Dr. Bell's brochure is to urge the use of calcium chloride in the treatment of tuberculosis. It is written in a tautological, rambling, and inconsequential style, with speculative interpolations concerning the etiology of tuberculosis and invectives against the effect of "Kochism."

While far from being a specific, there is no doubt that calcium chloride is a useful remedy in certain cases of tuberculosis, and especially in the management of children exhibiting evidences of what we are wont to term "scrofula." In the medicinal treatment of enlarged lymphatic glands, the reviewer knows of no agent equal to this drug. Dr. Bell is unquestionably entitled to great credit for his persistence in advocating its use, but the honor of introducing it into English practice belongs to Thomas Beddoes, the father of pneumatic medicine and of the rational treatment of tuberculosis. S. S. C.

EPIDEMIC INFLUENZA: NOTES ON ITS ORIGIN AND METHOD OF SPREAD. By RICHARD SISLEY, M.D., M.R.C.P. Pp. 150. London and New York: Longmans, Green & Co., 1891.

ANY effort directed toward limiting the spread of a disease the visitations of which in previous epidemics and in those of very recent date have created such widespread havoc deserves commendation. Therefore these somewhat verbose "notes," which were apparently prepared with the prime object of indicating the importance of the compulsory notification of influenza, because of the preponderating evidence existing, and here partly presented, in favor of its contagiousness, should have a favorable reception and be carefully read by those who have not yet awakened to the fact that this affection can be communicated by contact. The author deals with this part of the subject in a convincing manner. It is to be regretted that his style is characterized by a constant tendency toward diffuseness, which needlessly consumes the time of the reader in arriving at the essence of the subject, and renders the book of greater size than the matter at hand warrants. It seems rather incongruous to devote five pages of a small brochure to the nomenclature of influenza, or to occupy several pages in the discussion of rather unimportant data which at the same time are sufficiently considered in marginal explanatory notes. Apart from these imperfections in style, which, indeed, are quite venial, as they do not especially militate against the usefulness of the pamphlet, and are perhaps indicative both of juvenility in literature and a pardonable enthusiasm on a subject about which it is felt too much cannot be said, the book merits praise. D. D. S.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.A., M.D.,

PROFESSOR OF CLINICAL MEDICINE IN THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; ASSISTANT VISITING PHYSICIAN TO BELLEVUE HOSPITAL.

The Treatment of Tabes Dorsalis by the Method of Bonuzzi.

In the *Revue de Thérapeutique Générale et Thermale*, 1892, No. 2, p. 25, we find a clear and concise statement of this method, which, it is hoped, will yield results as satisfactory as those attributed to suspension, without, however, exposing the patient to the same dangers, nor indeed requiring the use of any apparatus whatsoever. The experiments upon the cadaver have shown that the mechanical distention undergone by the spinal cord is three times as great in this method as in suspension. The patient lies upon the back, head maintained in an elevated position by means of a bolster. The lower extremities are flexed upon the body through a semicircle, the knees being placed upon the chest of the patient, the legs being held straight; the operator, seizing the diverging ankles, carries them strongly toward the floor. The result is, that the vertebral column is strongly flexed forward. This position must be attained with care, for it gives rise to backaches and swellings of the posterior aspects of the thighs, due to intra-muscular hemorrhage. Benedikt reports a case where attacks of syncope and vomiting for many hours, with adynamia for several days, followed this treatment. It also has a greater effect upon respiration and circulation than does suspension; but the distention to which one subjects the trunk and limbs can be readily graduated, and, if necessary, it can be immediately terminated. Benedikt reports that the gait of the patients was greatly improved, and the neuralgias markedly and constantly relieved.

The Management and Care of Patients with Hemiplegia.

Dr. William M. Leszynsky contributes a valuable paper in the *New York Medical Journal*, 1892, vol. lv. p. 202. Rest to be insisted upon; evacua-

tion of bowels and bladder; avoid bedsores by the application of a 25 per cent. solution of oxide of zinc in alcohol to the suspected part; early passive motion; electricity (faradization) after four to six weeks; if contractures, then galvanization (negative pole on nerve-trunks), the most potent remedy being a combination of the "essence of patience" and the "tincture of time." As prophylactic measures: avoid muscular overstraining, reduce nitrogenous food, keep bowels free, diminish high arterial tension, remembering that much depends upon the coöperation, self-denial, and self-control of the patient.

The Electric Douche.

Dr. W. S. Hedley, believing that the action of electrized water by means of the electric bath is the least painful way of applying the current to the body, uses a movable jet douche, obtaining his electricity from a seventy-four cell Leclanché battery with a milliampère-meter in the circuit. With salt water he could obtain a stronger current. It seems not unreasonable that with combined electric and hydriatric procedures we have a therapeutic agent of considerable power.—*Lancet*, 1892, No. 3574, p. 469.

Phenyl Urethan.

M. Ed. Égasse has studied this substance, to which Giacosa gave the name of Euphorine (*Bulletin Générale de Thérapeutique*, 1892, 2e. liv., p. 19). It occurs in crystals, slightly soluble in cold, more so in hot water, but soluble in all proportions in ether and alcohol. Therapeutically, it is an energetic antipyretic without any danger, but indeed a beneficial effect upon the general condition. The dose is about seven and one-half grains, which will reduce the temperature, commencing in from twenty to forty minutes, one to three degrees (centigrade), and this defervescence lasts from four to twelve hours. The mechanism is like that of other antipyretics—by vasomotor dilatation. Profuse sweating is a usual accompaniment of this reduction of temperature.

According to Santoni, it is an anti-rheumatic in doses of fifteen to twenty-two grains. As an analgesic the results have been variable and generally unfavorable, with the exception of nervous headache. As a local antiseptic, in inveterate varicose ulcers, as a 10 per cent. ointment Oliva has had satisfactory results. In dermatological practice, Peroni has found that it presents marked advantages over iodol, sozo-iodol, aristol, resorcin, and chloral hydrate, in that it arrests suppuration, destroys odor, stimulates granulations, prevents the diffusion of virus from venereal ulcers. Internally, it can be administered in wafers, but, on account of the burning sensation which it produces in the stomach, these should be avoided. Better is it to dissolve the remedy in Malaga or Marsala wine. For use externally, the sharp crystals must be powdered or dissolved in alcohol, 10 to 50 per cent.

Teucrium Scordium in Pruritus Ani.

Dr. John H. Brinton (*Therapeutic Gazette*, 1892, No. 1, p. 3) has observed that in certain obstinate and intractable cases of this disease, when the symp-

toms are absent during the day but appear as soon as the patient is warm in bed, this remedy, recommended by Dr. André Lebel, is valuable. He uses the powdered leaf of the wild germandra, a plant of Southern Europe. The dose is ten to twelve grains, suspended in water, taken three times a day, about half an hour before meals. The powder looks and tastes like a form of pepper, is an active stomachic, and stimulates the appetite. Great relief follows its exhibition for a week or ten days. In advanced cases of itching with hæmorrhoids it is not of much value, being curative only in the initial period of the disease and in the disturbed neurotic condition.

The Treatment of Migraine.

Dr. Savigny believes that the etiological conditions must be considered. Those predisposed to this disease are the neuropathics, gouty, rheumatics, diabetics, and anæmics. Constipation is an important adjuvant condition. The use of narcotics (morphine hypodermatically) is objectionable, in that it causes vomiting, is only palliative and not curative, and increases the constipation. Chloral only fulfils a symptomatic indication. The analgesics, salicylic acid, antipyrine, exalgine, acetanilide, and indeed sulphate of quinine, yield cures, but often relapses quickly follow. Haig, believing that in gouty subjects there is a connection between this and an increased excretion of uric acid, uses large doses of citric or nitro-muriatic acid. He believes that antipyrine acts in the same way. A nitrogenous diet, meat, cheese, and beer, should be forbidden. By its chemical acid the good effects of chloride of soda are explained (Batom, Nothnagel, Rabod); this, however, has been useless if there exists a gastralgia. The treatment between the attacks may be the reduction of obesity (method of Oertel), hydrotherapy, total rest, physical and intellectual, before a cold bath, with physical exercise afterward, or if the bath is a hot one, followed by rest (procedure of Pelezeus). For the attack itself, Dunn has used cocaine hypodermatically, although it often causes insomnia, agitation, exaggerated reflexes, rapid pulse, palpitation. Rossbach believes in the value of local massage. Neftel uses hot water to increase transpiration, muscular exercise, improvement of the general condition. Morris Lewis uses ten drops of the tincture of eucalyptus four to six times daily, while Gill Wylie has prescribed with success a grain of ox-gall and a drop of essence of gaultheria six times daily. The author employs caffein and bromide of ammonium in peppermint water, every two hours during the attack, recommending, in addition, electricity, either static or galvanic, with general faradization. — *Revue de Thérapeutique Médico-Chirurgicale*, 1892, No. 4, p. 94.

Bradycardia and the Action of Atropine.

In the *St. Petersburger medicinische Wochenschrift*, 1892, No. 1, S. 1, Prof. Karl Dehio shows that by the use of atropine we can readily differentiate between the cases of bradycardia due to vagus irritation and those of the automatic motor apparatus, since this remedy paralyzes the vagus endings in the heart. The four recorded instances show clearly that this method is a valuable one. In studying the association of such anatomical changes as

fatty degeneration, fibrous myocarditis, sclerosis of coronary arteries, thrombotic myo-malacia, he believes that these conditions are more often present without than with bradycardia. It was further noted that the older the individual the less was the acceleration which was produced by atropine.

Atropine and Morphine.

H. Unverricht (*Centralblatt für klinische Medicin*, 1892, No. 3, S. 49) attacks the position assumed by Binz, that atropine is an antagonist to morphine so far as the cerebral cortex and the respiratory apparatus are concerned. He believes that atropine is not a stimulant for the normal respiratory apparatus, basing this conclusion upon the laboratory work of Orlowski.

The Arsenical Springs of La Bourboule.

Dr. A. W. Gilchrist, in the *Climatologist*, 1892, No. 1, p. 2, gives a temperate statement of the value of these waters in the treatment of lymphatism, struma, and scrofula, chronic diseases of the skin ("herpetic" of the French writers), syphilis, anæmia and chlorosis, malaria, diabetes, affections of the throat and respiratory passages, gout, and chronic rheumatism.

[We believe that these waters are worthy of a more careful study by the American profession, and that a visit to interesting Auvergne would be of more value, in carefully selected cases, than to other better known resorts.—R. W. W.]

The Treatment of Syphilis by Mercurials.

The *Centralblatt für die gesammte Therapie*, 1892, No. 1, S. 1, contains a notable paper by Prof. Eduard Lang, in which he also discusses the question of nephritis in luetic subjects. The nephritis in early stages of syphilis can be either an infectious or a syphilo-toxic nephritis; in either case there is a call for an antisyphilitic, often indeed a mercurial treatment. In late syphilis, the nephritis may be of mercurial-toxic origin. Of course, the possibility of the nephritis antedating the syphilis, or being independent of it, must always be considered. From the results of observation it is certain that mercury may give rise to a nephritis.

It is important that the dose should be absolutely known, and such preparations as those in which the drug is not kept evenly disseminated through the menstruum should be avoided. Inasmuch as stomatitis may go on to gangrene and formation of scar-tissue and a mercurial entero-colitis may be set up, it is fair to presume that renal degeneration which is beyond repair may follow the administration of mercury, particularly when it is in unusual doses, although even small ones will at times produce these untoward results. As the best method he uses *oleum cinereum* in 50 per cent. solution, of which he uses one drop subcutaneously, to be repeated at intervals of five to seven days. In the first week, however, three doses up to one drop are given. Eight to sixteen treatments are necessary for cure. With this method relapses are less frequent and of moderate severity.

[*Oleum cinereum* (gray oil), introduced by Lang in 1886, is prepared by rubbing one part of lanolin with considerable chloroform to emulsion, thor-

oughly triturating the mixture, the chloroform evaporating during the process. While it is fluid two parts of metallic mercury are added, and the trituration continued. As a salve it is diluted with fresh almond or olive oil to the required mercurial percentage.—R. W. W.]

Severe Accidents of Iodism.

An unsigned paper in *La Semaine Médicale*, 1892, No. 5, p. xviii, gives an excellent account of our present knowledge upon this subject. Œdema of the glottis, of the same kind as serous infiltration of the eyelids, has easily caused death. In instances when at death the body has been covered by a pemphigus, a nephritis has generally been found. At times, even when death has resulted from œdema of the glottis, this renal condition has not been found. Curiously enough the doses which have been followed by œdema of the glottis have been, in general, small (six and one-half grains, Fournier). Attempts have been made to avoid such symptoms as œdema, coryza, headache, conjunctivitis, and epiphora, by its exhibition in milk, or the administion with belladonna, or bromide of potash. Following the method of Röhmann and Malachowski, it is believed that the bicarbonate of soda will prevent these untoward symptoms, by rendering the blood more alkaline, which will hinder the setting free of the iodine of the iodide of potash. It is given in two daily doses to the amount of seventy to ninety grains. In all cases the integrity of the renal filter should be assured, although even in actual renal disease, as chronic interstitial nephritis, we may receive great benefit from this drug. While disease of these organs is not an absolute contra-indication, yet it should be administered in the usual (not small) doses, and at the outset, preferably with the bicarbonate of soda.

New Observations on the Physiological Action of the Mercurials and Iodides.

In *Merck's Bulletin*, 1892, No. 1, p. 3, Dr. William Henry Porter attempts to find a clear and rational physiological explanation for the good effects that are known to follow when these substances are introduced into the system as medicinal agents. He believes that these inorganic compounds, taken into the body in excess of the absolute demands of the physiological economy, act as foreign bodies, and in this way become universally irritants to the system. To remove this element the system is called upon to make abnormally great exertions, and in attempting this extra amount of work there is at once a demand on the part of the physiological economy for a larger nutritive supply to accomplish this excessive amount of work. If the foreign body can be eliminated from the system, and a sufficient nutritive pabulum supplied and assimilated to sustain this increased demand upon the vital expenditures, the system is in this indirect manner generally improved in its nutritive vitality. He concludes that the inorganic compounds are not chemically decomposed in the system, but act by their mechanical presence; that the action of the mercurials and iodides is governed by the same general chemical and physiological laws, and that they act in a similar manner; that the urine should be carefully watched and

frequently examined when using these inorganic compounds; that diet, digestion, and assimilation should be as accurately regulated as the dose of the drug, if the best results are to be obtained from our therapeutic agents.

Therapeutic Results of Direct Electrization of the Stomach.

Dr. Max Einhorn, in the *New York Medical Record*, 1892, No. 5, p. 116, and No. 6, p. 142, gives the results of his observations in the use of his deglutable electrode. He concludes that direct gastro-faradization proves to be useful in many ways in most chronic diseases of the stomach. The favorable results appear very clearly and pretty quickly in those cases of stomach dilatation which are not caused by any obstruction of the pylorus, but merely by the relaxation of the muscular coat or the stomach. Here the gastro-faradization is beneficial, no matter whether in these cases there is hyper-acidity or sub-acidity of the stomach contents. Cases of relaxation of the cardia (eructations), and also of relaxation of the pylorus (presence of bile-secretion in the stomach), were very favorably influenced by faradization. Here the result was most markedly pronounced, inasmuch as, besides the subjective amelioration of the patient, the objective examination showed at the same time the absence of bile in the stomach contents (there was, however, only one case of relaxation of the pylorus under observation). Direct gastro-galvanization was administered with very good results in cases of obstinate gastric neuralgia; several of them had resisted every therapeutic means, but yielded to the influence of galvanization.

Caffein.

Dr. Nicola Ferraro concludes that this remedy is useful in altered nutrition (hypotrophy)—viz., in marked pyrexia of infection, advanced diffuse arterial sclerosis, alcoholism, anæmias, or in local conditions, hypertrophy, dilatation, pericarditis, myocarditis, atheroma of coronary arteries. The dosage is important, for it stimulates the vagus only in large doses (Semmola). Huchard recommends from five to forty-five grains; of late, fifteen to forty grains at the outset. It is recommended to be administered hypodermatically, noting the observations of Tanret, with equal parts of salicylate of soda or benzoate of soda, which gives a clear solution in distilled water.—*Internationale klinische Rundschau*, 1892, No. 7, S. 262.

Oxygen Gas.

In acute respiratory affections, Dr. E. Markham Skerritt believes that the effects of the administration of oxygen gas are more striking in improving the tone of the pulse, in causing the cyanosis to disappear. He reports an instance in which the gas was used, although a fatal issue was not averted.

In asthma and convalescence, Mr. Aubrey Blakiston gives his testimony as to its value in the first condition. In the latter he believes it to be, combined with massage and electricity, one of the best substitutes for change, exercise, and sea air.—*British Medical Journal*, 1892, No. 1623, p. 269.

In the *Lancet*, 1892, No. 3574, p. 464, Dr. William Collier and Mr. Horatio P. Symonds report a case of recovery in severe broncho-pneu-

monia following influenza, and believe that this result was brought about by the continuous administration of oxygen gas.

Syringes for Subcutaneous Injection.

The *Journal de Médecine et de Chirurgie pratique*, 1892, 2e. cahier, p. 49, gives full and accurate information concerning the syringes of Malassez, Félizet, Gimbert, Burlureau and Guerder, and Peter. The last three forms possess especial interest, in that the treatment of tuberculosis by injection of medicated oils (creasote 1 to 14, iodol or iodoform 1 to 29, crystallized phenic acid 1 to 49, or guaiacol) is now recommended. The technique is fully given, the accidents carefully stated, precise antiseptic precautions noted, and, taken as a whole, this paper is a complete guide to the practice of voluminous subcutaneous injections.

The Antiseptic Treatment of Typhoid Fever.

Mr. A. A. Parry, in the *Australian Medical Journal*, 1891, No. 12, p. 569, reports six cases treated by the antiseptic method, chiefly by the use of chlorine. He concludes that, however powerful the perchloride of mercury may be in stopping the growth of bacteriological preparations, it loses its effect when used for that purpose in typhoid fever. In using liquor chlori there was, on the following day, an evident change for the better in the stools. The effect on the temperature was not so marked; in no case did it limit the disease. It is administered in drachm doses, every hour for twelve hours, and then every second hour.

Contrary Action of Certain Drugs.

Dr. R. Lépine (*La Semaine Médicale*, 1892, No. 4, p. 21) reports an instance where ergot produced a congestion of the face. He prefers to call this an accessory action rather than, strictly speaking, a contrary one. A similar result occurred in a phthisical patient who had received one seven-and-one-half-grain dose of acetanilide, when there was marked perspiration but intense congestion of the face. This is not paradoxical, for, indeed, the vaso-dilators are more readily excited, and a small dose can influence these without exciting their antagonists, and in this case with diminished dose the congestion was at its height. In a case of severe acute articular and visceral rheumatism the salicylate of soda apparently caused jaundice due to congestion of the liver, and as well a rise in temperature. He believes that, exceptionally, due to particular conditions of the patient, an antipyretic may be responsible for a rise of temperature.

The Treatment of Gall-stones by Large Doses of Olive Oil.

Dr. James F. Goodhart (*British Medical Journal*, 1892, No. 1622, p. 219), in reporting five cases, concludes that he cannot claim anything more than a suspicion in favor of the value of the administration of oil. He found, however, some difficulty, but never an insuperable one, in exhibiting this remedy, and judging from his experience, a great deal has been digested and

absorbed. He orders the oil to be taken with mashed potato, or spinach, or salad, or even with some kinds of fish.

The Conditions of Cure in Consumption.

Dr. I. Burney Yeo, in the *British Medical Journal*, 1892, No. 1620, p. 106, in commenting upon the well-known fact that in persons dying of other diseases there are numerous instances where anatomical evidence is discovered of arrested and cured pulmonary tuberculosis, yet is compelled to admit that as we meet it in its clinical forms it is rarely cured. An early diagnosis is essential, based on slight modifications of respiratory sounds, accompanied by some evidences of disturbance of general health. Early hæmoptysis is favorable to cure, because it assists an early diagnosis. Also favorable is the tendency toward fibrous changes, as well as a lack of irritability of the tissues, that absence of tendency toward acute inflammation, the possession of a sound constitution; possibly, also, the mitigated virulence of the bacillary infecting agent, a sound condition of the organs of digestion and assimilation. The therapeutic conditions which favor cure are: attention to detail in feeding (*sur-alimentation*); life in the open air of the country or by the sea; a dry, pure atmosphere, not necessarily a cold one. Among antiseptics, none are so uniformly beneficial as are creasote or guaiacol.

Poisoning by Male Fern.

In the *Prager medicinische Wochenschrift*, 1892, No. 5, S. 43, and No. 6, S. 57, is found a medico-legal review of this subject, by Prof. A. Paltauf. The symptoms are chiefly of irritation and inflammation in the digestive system, disturbance of the respiratory and circulatory systems, with very marked impression upon the brain and spinal cord. He reports a carefully observed case, with results of post-mortem and chemical and microscopical investigation. Apparently the number of cases of poisoning has increased since the ethereal extract has been more extensively used but the doses have not been unusual ones. It is likely, also, that the administration in olive or castor oil may give rise to poisonous effects. Further, there may also exist an idiosyncrasy of the patient himself.

Iodoform Poisoning.

In the *Berliner klinische Wochenschrift*, 1892, No. 7, S. 142, appears a paper by Dr. P. Naecke, reporting an instance occurring in his own person. The symptoms were paraphasia, without hallucinations, weakness of power of thought and intelligence, forgetfulness, depression of spirits, melancholia, agrypnia, hypochondriasis. After these symptoms had persisted for two months he entered a sanitarium, where he recovered after eight weeks' treatment. A month later he again commenced his work.

Codeia Poisoning; Recovery.

Dr. C. Mettenheimer sounds a note of warning that the use of this remedy for catarrhal disease of the respiratory tract may not be without

danger. A patient was directed to take a half-grain pill every three hours. She took, however, four pills at once, which produced violent vomiting, pain in abdomen without passage, retention of urine; general condition bad; great drowsiness—without sleep, however. The next day there was myosis; heart and respiration rapid, the latter possibly being due to anxiety. Complete recovery followed within three days.—*Memorabilien*, 1891, 3. Heft, S. 136.

Aristol for Venereal Ulcers.

Dr. T. Edmund Güntz, in *Memorabilien*, 1891, 2. Heft, S. 65, gives the results of two years' use of this remedy. He employs the powder dusted over the ulcer, and renders the medicament soluble by dropping upon it a small quantity of olive oil from a glass rod, so that it is evenly distributed through the powder and does not form masses, when it is to be covered by a bit of protective. This dressing is to be changed twice daily. Aristol succeeds better with syphilitic ulcerations than with so-called chancroids.

Alcoholism and Tuberculosis.

Dr. Hector W. G. Mackenzie believes that tubercle is more frequent among the alcoholics than is usually believed. The commoner type of alcoholic phthisis is a combination of excavation with broncho-pneumonic consolidation, the fibroid change being the rarer form. Alcoholism is a very frequent antecedent when there is not inherited susceptibility to tubercle. The condition of the patient is generally worse than would be expected from the amount of disease revealed by physical examination; the progress of the disease is more rapid, and the prognosis particularly unfavorable. Alcoholic drink in excess, so far from being a preventive, has an influence in the opposite direction.—*British Medical Journal*, 1892, No. 1626, p. 433.

[These observations are important, in view of the fact that alcoholic stimulants are so frequently prescribed in large doses and for considerable periods of time in tubercular patients.—R. W. W.]

Aconite Poisoning; Recovery.

Dr. G. H. Tuttle reports a case of recovery after ingestion of seven and one-half drachms of this tincture. Medical assistance was obtained in forty-five minutes. Hypodermatic injections of brandy and twenty drops of tincture of digitalis; injections *per rectum* of twenty drops each of tincture of digitalis and nux vomica, with brandy; ether and ammonia to the nose; digitalis and brandy was continued in smaller doses. After four hours the patient complained of burning pain in the stomach. Three days afterward the patient was able to be about and to do light work.—*Boston Medical and Surgical Journal*, 1891, No. 26, p. 678.

Piperazin.

Drs. Biesenthal and Albr. Schmidt (*Berliner klinische Wochenschrift*, 1892, No. 2, S. 28) conclude from clinical observations that it is more valuable than any known remedy to dissolve uric acid and its concrements; being

slightly absorbed from the stomach, it reaches the substance to be dissolved practically unchanged; it is best given in dilute solution—in soda-water—fifteen grammes daily. Its taste is not unpleasant; in proportion of 1 to 500 parts of soda-water it is not detected. It does not irritate mucous membranes. Its easy solubility permits subcutaneous injection into tophi. A 1 or 2 per cent. solution in one part of spirit and four of water, used as a Priessnitz's compress, is valuable for gouty swellings. It acts not only upon uric acid, but also upon phosphatic and oxalic acid calculi.

Coronilla.

M. V. Poulet (*Bulletin Général de Thérapeutique*, 1891, No. 46, p. 481) gives the result of his studies. The tincture of the entire plant was used in daily dosage of from one to two and a half drachms, believing that it was valuable in paroxysmal tachycardia, in the painful phenomena of certain reflex cardiopathies, in the disorders occasioned by changes at the aortic orifice; it relieves the symptoms due to lesions of the mitral valve; that it cuts short, frequently in a remarkable manner, the attacks of cardiac or bronchial asthma; it increases the appetite; is a tonic so far as the alimentary canal and general system are concerned. It is superior to digitalis in that it does not have a cumulative action, is not a depressant, nor does it give rise to digestive disturbances. Its chief value seems to be in the nervous affections (erethism) of the heart, whether primary, or secondary to a general neurosis, particularly in cardiac disturbance due to excess in venery, tobacco, coffee, or alcohol.

The following papers are worthy of notice:

"On Fissures of the Bladder Mucous Membrane in Women," by Dr. T. Heitzmann (*Centralblatt für die gesammte Therapie*, 1892, No. 2, S. 65). Examination with endoscope. Cure of catarrh of bladder by weak solutions of permanganate of potash, boracic or salicylic acid. Local treatment of fissure by application of cotton wet with solution of nitrate of silver, sulphate of zinc or copper. Support to uterus and bladder by glycerin tampons in vagina.

"Comparative Value of the Digitalins of Commerce," by Dr. J. Fouguèt (*Bulletin générale de Thérapeutique*, 1892, 4e. liv., p. 71). A laboratory study in frogs, rabbits, and dogs. He concludes that digitalin represents all the properties of the plant. Commercial digitalins contain other principles, more or less active, besides this. Those digitalins soluble in chloroform and insoluble in water have the same action, and should be employed by the physician, preference being given to crystallized digitalin, which should be given in one dose of one sixty-fourth of a grain. On the next day or day after, if the diuresis is insufficient, it can be repeated in one-half or full dose, but not to be continued, because of cumulative effects.

"Chloroformization with Small and Continuous Doses," by Dr. Marcel Baudouin, in a reprint from *Gazette des Hôpitaux*, 1892, pp. 88; method of Dr. Léon Labbé, quoting the *Mémoires* of M. Peyraud. An accurate and painstaking monograph, presenting a forcible argument for the adoption of this method.

"Treatment of Mitral Insufficiency." A paper based upon a lecture by PROF. DIEULAFOY (*Revue de Thérapeutique Générale et Thermale*, 1892, No. 3, p. 33). Carefully prepared and concise.

"Therapeutic Use of the Salts of Strontium," by DR. G. BARDET (*Nouveaux Remèdes*, 1892, No. 3, p. 52). A *résumé* of existing knowledge, giving the chemistry, pharmacology, and therapeutics, with formulæ.

"Massage in Medical Diseases," by DR. ERNEST BARIÉ (*Revue générale de Chirurgie et de Thérapeutique*, 1892, No. 2, p. 18). Mentions rheumatic arthropathies, muscular rheumatism, neuralgias, dilatation of stomach, and constipation. Moderate in tone.

"Pental," by DR. E. WEBER (*Münchener medicinische Wochenschrift*, 1892, No. 7, S. 105). Chemistry, with brief clinical report.

"Oxygen and Strychnine in Respiratory Troubles," by DR. COUPER CRIPPS (*British Medical Journal*, 1892, No. 1626, p. 436). Case of pneumonia, secondary to influenza, recovered by energetic use of these remedies.

"Influenza Pneumonia Treated by the External Application of Cold," by MR. WM. GORDON (*Lancet*, 1892, No. 3574, p. 466). Fenwick's ice-pail method; patient had also salol, liq. ammon. acet., chloral, and laudanum.

MEDICINE.

UNDER THE CHARGE OF

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A CASE OF SYRINGOMYELUS.

DRS. HUGHLINGS JACKSON and GALLOWAY record the following case of this disorder in the *Lancet*, 1892, No. 3573:

The patient is a stout, healthy-looking woman of forty-nine years, whose grandfather died at an advanced age, suffering from a nervous disease that caused contraction of the lower extremities. She has eight healthy children. At twelve years of age she was treated at St. Louis, Mo., for a deep cut on the extensor surface of the right forearm. Twenty-two years ago she had an attack of "sunstroke" while in the garden on a hot summer afternoon; she was unconscious for two hours. After this attack she gradually lost sensation in the right arm and hand, and on the right side of the body. She soon observed loss of power in the forearm and hand, affecting chiefly the third, fourth, and fifth digits, and became awkward at work and easily fatigued. Fifteen years ago she received a severe scald on the right fore-

arm, and her attention was especially directed to the loss of sensation. Since that time she has frequently burnt and otherwise injured her right fingers and arms, being unable to feel that water was too hot to wash in. Twelve years ago she sustained a lacerated wound of the right elbow, attended by much inflammation, and giving rise to an axillary abscess. For two and a half years at least, the third, fourth, and sixth fingers have been stiff and contracted.

Eight months ago, while wringing out clothes, something cracked in her right elbow and she had to stop work on account of the pain on movement. The same night the right elbow swelled greatly and remained large for many months. She says the elbow became "dropsical."

When first seen her condition was as follows: "The right elbow and forearm are considerably larger than the left. The right elbow-joint is quite disorganized, and there is some, though not excessive, osteophytic growth in the neighborhood of the joint. The forearm can be moved laterally at the joint for about a quarter of an inch with much grating. Movements at the elbow cause a little discomfort, but little or no pain; complete extension is impossible on account of the altered relations of the joint surfaces; the other movements are abnormally free, and are attended with grating in the joint. The right wrist has also been somewhat swollen, and slight grating can be obtained on movement. The third, fourth, and fifth digits of the right hand are permanently flexed and contracted, the second and first digits show similar changes, but not to the same extent. Wasting of the thenar, hypothenar, and interossei muscles is well marked."

Electrical reactions of the affected muscles revealed diminished excitability to both constant and interrupted currents, but no qualitative changes in reaction. Over an area including the front and back of the right upper extremity, the right side of the scalp, face and neck, and the right side of the trunk to the level of the tenth dorsal vertebra, there was marked alteration in sensation. Thus, she could not distinguish between a touch with the finger and the prick of a pin, or heat from cold. The muscular sense in the arm was retained. The limit of altered sensation was sharply defined below and in the middle line. Sensation in the mucous membranes was affected in a similar fashion. The sense of smell appeared less acute with the right than with the left nostril. Sight and hearing were normal. The lower extremities were unaffected. The case emphasizes the fact that the lesion characteristic of syringomyelus, which is apparently of congenital origin, may exist for long in the cord, simply as a deformity, without causing evident symptoms. The affection of the head and neck is somewhat rare. The occurrence of an acute arthritic degeneration, exactly similar to that so often met with in tabes dorsalis, is of interest. The axillary abscess was probably of infective origin and in no way connected with the painless collections of pus occurring on the fingers as described by Morvan.

A Case of Myxœdema Successfully Treated by Massage and Hypodermatic Injections of the Thyroid Gland of a Sheep.

The patient first saw Dr. Wallace Beatty, of Dublin, in October, 1891. She had then suffered from progressive myxœdema for six or seven years, and

presented all the classical features of the disease. After six weeks' treatment by massage there was an undoubted improvement in the patient's condition. Still the improvement was not sufficient to hold out a hope that a prolonged course of massage would effect even a partial cure. Accordingly it was decided after consultation to try hypodermatic injections of sheep's thyroid. The extract was made according to the directions given by Dr. Murray (*Brit. Med. Journ.*, October, 1891): "The lobes of the thyroid gland of a sheep were removed immediately after it was killed, the instruments used having been rendered aseptic. The surrounding fat and connective tissue were removed from the lobes. Each lobe was cut up into small pieces on a glass dish, the glass dish having been previously washed with a one in twenty solution of carbolic acid. The pieces were put into two sterilized test-tubes, one for each gland, and over them was poured, in sufficient quantity to cover them, a solution containing a one-half per cent. solution of carbolic acid and glycerine in equal parts. The test-tubes were left in a cool place for twenty-four hours. The contents were then strained through fine muslin into a glass-stoppered bottle, and the muslin squeezed so as to express as much liquid as possible; the muslin was previously placed for a few minutes in boiling distilled water, and the bottle was also previously disinfected.

"The extract so prepared from the two lobes of one thyroid gland was given in three parts, with two days' interval between. The patient experienced no unpleasant sensations."

Up to February, 1892, the extracts of five thyroids had been injected; each extract being given in three separate injections within a week of its preparation.

The effect of the injections is described as marvellous.

"The improvement has steadily progressed. Now she is practically cured; the face looks natural, the skin of the face is now no longer thickened, but is thin and wrinkled; the eyelids are not swollen; the lips are natural; the tongue is of natural size; speech is rapid and easy; the hands are no longer clumsy, she can give a hearty and firm "shake-hands;" her rings are loose and easily removable; her movements are active; her hair, which had become thin, is now growing thickly; her memory has returned; menstruation is natural. No physician, seeing her now for the first time, could recognize the case as one of myxœdema."—*Brit. Med Journ.*, 1892, No. 1628.

Note Toward the Localization of the Knee-jerk.

C. S. Sherrington, M.A., M.B. (*British Medical Journal*, 1892, No. 1628) states:

"Of whatever nature the knee-jerk ultimately may prove to be, whether it be reflex or whether it be direct, the phenomenon is admittedly in intimate dependence on the integrity of a reflex arc. The muscle concerned is well known to be the quadriceps extensor of the thigh; the motor nerve concerned to be the anterior crural.

"I found that not the whole of the quadriceps extensor of the thigh or of the anterior crural nerve is necessary for the "jerk"—it depends upon the vastus internus muscle, and perhaps the subcrureus as well; and on the branches of the anterior crural nerve to those muscles.

"If the branch given by the anterior crural nerve to the vastus internus and subcrureus be cut through, the knee-jerk disappears at once, although the nerves to the rectus femoris, the crureus, and the vastus externus, all remain intact. If, on the other hand, all the branches given by the anterior crural nerve to the rectus femoris, crureus, and vastus externus are divided, the knee-jerk remains brisk so long as the branch to the vastus internus be left intact.

"In the cat I found that contemporaneous section of the spinal nerve-roots of the lumbo-sacral region, if the sixth be spared only, makes the knee-jerk brisk, but that section of the sixth root alone, all other roots being intact, abolishes the jerk. In the monkey the same fact holds, but the root on which the jerk depends, instead of being the sixth lumbar, is the fifth lumbar. The sixth lumbar of the cat corresponds in its anatomy and physiology with the fifth lumbar of the rhœsus monkey; the fifth lumbar of the rhœsus corresponds in like manner with fourth lumbar of man.

"The cutting across of the posterior root of the fifth lumbar nerve of the rhœsus abolishes the knee-jerk at once.

"That the knee-jerk should be related to only one nerve-root is singular when one remembers that the limb muscles are for the most part supplied by more than one spinal nerve.

"Longitudinal section of the cord along the median line throughout the lumbo-sacral region did not obviously affect the knee-jerk of either side, right or left."

The Treatment of Tuberculosis with Tuberculocidin.

Klebs (Hamburg and Leipzig: Leopold Voss, 1892) has issued a preliminary announcement of the results obtained by the treatment of tuberculosis by means of tuberculocidin, a derivative of tuberculin. The various modes of obtaining the preparation have in common the object of precipitating, by means of platinum chloride and the so-called alkaloid reagents, the deleterious constituents of crude tuberculin, and leaving in solution the curative principle, an albumose, precipitable by alcohol. Tuberculocidin, or alexin, is not merely attenuated tuberculin. Although the former represents by weight one-fortieth of the latter, an injection of two and a half milligrammes of tuberculin in a tuberculous subject is followed by decided febrile reaction, while an injection of tuberculocidin occasions no elevation of temperature. On the contrary, the judicious employment of tuberculocidin may be followed by a disappearance of hectic fever. Tuberculocidin is also wanting in the depressant effect upon the circulation that follows the employment of crude tuberculin. It is thought that tuberculocidin acts by causing degeneration of tubercle bacilli. Large doses may be followed by elevation of temperature as the result of an action comparable to that of tuberculin, from the setting free of the products of disorganization of the bacilli. In susceptible animals, especially guinea-pigs, injections of tuberculocidin in anticipation of tuberculous inoculation, retards the development of the tuberculous process. Anatomically, it can be demonstrated that treatment with tuberculocidin is followed by involution and dissolution of tuberculous tissue, taking place especially in the form of an exudation in the diseased structure. Necrosis,

however, does not occur, and there is no risk of establishing a miliary tuberculosis. The results are the better and the more rapid the earlier after infection that treatment is begun. In man two milligrammes may be tentatively given as the first injection. If this be followed by no considerable elevation of temperature, the dose may be rapidly increased to a decigramme or a decigramme and a half. Hectic fever is not a counter-indication. The injections may be given daily for about a month and be intermitted for a month, to be resumed or not according to the conditions that exist.

About a hundred cases of tuberculosis in human beings have been treated with tuberculocidin, but sufficient time has elapsed to permit of an analysis of but seventy-five. Of these, fourteen were cured; forty-five were improved; fourteen remained unimproved; and two died. Most were cases of severe, or at least unequivocal pulmonary tuberculosis. In two cases, symptoms of apparently indubitable cerebral tuberculosis disappeared during treatment. In another case referred to, attended with hæmoptysis, and in others with hectic fever, the symptoms were ameliorated and the general condition was improved. In some instances the conjoined employment of other measures, such as super-alimentation, aërotherapy, the rest-cure, the administration of drugs, like benzosol, may be indicated to improve the nutrition. Unpleasant results were not observed in cases of laryngeal tuberculosis. The treatment is not incompatible with surgical interference.

Ataxic Paramyotonia.

Gowers (*Centralbl. f. Nervenheilk. u. Psychiatrie*, February, 1892, p. 41) has reported the case of a man forty-one years old, with a history of syphilis of eleven years' standing, in whom for a year and a half an abnormal tonic condition of the muscles, first in the lower, then in the upper extremities, had existed. The patient was well nourished; the extremities were large and the muscles well developed and hard. This hardness was dependent upon tonic spasm that interfered with voluntary movement, rendering it slow and difficult. There was no special rigidity; extensors and flexors were apparently involved in like degree. The spasm was not diminished by repetition of movement, but was constant and opposed passive as well as active movement. There was at the same time some muscular weakness. In the upper extremities coördination was impaired. The muscle-sense was defective, especially as to posture, size, and weight. The electric irritability of the muscles was preserved. It was not possible to elicit the knee-jerk or other evidence of myotatic irritability, although the failure may have been dependent upon spasm. Tactile sensibility was lost upon the palms of the hands, diminished on the dorsal aspect of the terminal phalanges, and on the soles of the feet. There was often a sensation as of standing upon a circular base. The sense of pain was retarded upon the palms of the hands. The temperature-sense was almost normal. There was almost complete impotence. The actions of the sphincters were preserved. There was an absence of pain and of cerebral derangement. Gowers considers the affection as analogous to Thomsen's disease and dependent upon functional derangement of the gray matter of the cord, as a result of which there is increased activity of the motor nerve-cells that control normal muscular tone.

Aneurism of the Basilar Artery.

Klippel and Boeteau (*Bulletin de la Soc. Anatom. de Paris*, February, 1892, p. 81) have reported the case of a man thirty-five years old, without a history of syphilis, of alcoholism, or of rheumatism, whose mother presented for forty years evidences of mental alienation, and died at seventy-four of cerebral softening. In apparently perfect health, he was suddenly seized, without recognizable cause, with intense pain at the nape of the neck, radiating thence to the vertex; pain was likewise felt at the supra-orbital notch. Pain was almost continuous and was intensified in paroxysms, especially by cough. The patient had a sense of boiling in the head; he heard a continual roar; at times he felt as if the head would burst. The pain was generally mitigated by recumbency in the left lateral decubitus and by strong pressure made with the hands upon a compress placed upon the vertex. Motility soon became affected. There was a sense of heaviness, of torpor, of vague stiffness in the extremity; so that locomotion became painful, laborious, and difficult. Muscular spasm was added. In the upper extremities there was apparent impairment of coördination, but delicate movements could be performed, though, perhaps, with some difficulty. The handwriting was tremulous; but syllables were not omitted or duplicated; expression was intelligent. Prehension became difficult from contractures involving the hands. The manifestations lacked symmetry. Though not hemiplegic, they were more decided upon the right than upon the left. The muscular sense and motor power remained undisturbed. Articulation became difficult, speech was slow and monotonous, but neither stuttering nor scanning; ideas were clearly expressed. Vision in the left eye became impaired and finally lost. The pupil of the same eye was contracted. In the progress of the case motility and sensibility of the left side of the face were lost. Dysphagia appeared; there was a sense of the presence of a foreign body in the œsophagus. There were anæsthesia of the pharynx and paralysis of the velum palati. Late in the case epileptiform crises occurred. The onset of the attacks was preceded by vertigo; there was neither pallor, nor cry, nor loss of consciousness; the movements were most decided on or exclusively involved the right side of the body; the face usually escaped; at the same time there was forced movement to the right. The attacks lasted on an average for five minutes longer than those of true epilepsy. They recurred daily with great regularity, toward night, but never during sleep. Despite the frequency of the seizures they did not affect the psychic or physical condition. Finally, the patient became taciturn and apathetic. Somnolence developed. Respiration and circulation presented no abnormality. The appetite was preserved; digestion was well performed; constipation existed. There was a disposition to retention of urine. A few days after coming under observation, while taking a few steps, the man uttered a cry, became pale, lost consciousness, and fell backward, and soon died. At the autopsy a large extravasation of blood was found in the posterior fossa of the skull. Seated upon the left aspect of the basilar artery was a ruptured sacculated aneurism as large as a walnut compressing the left half of the bulb and the adjacent cerebellum and cerebral peduncle. The remainder of the vascular system, the heart, kidneys, and other organs were healthy.

Normal Temperature of the Aged.

Kelynack (Manchester) publishes in the *Medical Chronicle* (vol. xv., 1892, No. 5) the results of observations on the temperature of healthy old persons (eighty-two, eighty-three, and eighty-nine years of age), which tend to show (1) that the normal senile temperature, as registered both in the rectum and axilla, is very distinctly below that of healthy children and adults. (2) That the rectal or internal temperature in old age is almost always higher than the axillary, but varying from 0.2° to 1° F.

Exalgine Poisoning.

A. Lockhart Gillespie (Edinburgh) communicates notes of a severe case of exalgine poisoning (*Medical Press*, 1892, No. 2758). The patient, aged twenty-three years, took four doses of exalgine (methyl-acetanilide) in the course of a day (about thirty-six grains in all) for the relief of toothache.

When seen about midnight he was lying insensible, with rigid neck and retracted head, widely dilated, sluggish pupils, quiet, deep breathing, and a pulse of 79, of good tension. Soon after he became more sensible and complained of hammering inside the head. Speech was indistinct and he could not move the trunk or limbs voluntarily. Every few minutes there was a convulsion, beginning with "risus sardonicus" and groaning, followed in order by violent rolling of head and neck, spasm of cervical muscles, rigidity of both arms, and spasmodic contractions of abdominal muscles, the legs being barely affected. Tapping the head caused pain and brought on a convulsion, as did pricking the arm.

During the paroxysms the pain over the vertex was almost unbearable. At 1 A.M. ¼ gr. of morphine was injected, cold cloths applied to the head, and an hour later two purgative pills were taken. A little later he became more paralyzed and the convulsions more frequent. Of superficial and deep reflexes the cremasteric alone could be elicited.

The patient still complained of intense headache, inability to see, and total anæsthesia. As the pupils contracted the fits became less frequent. At 4.15 A.M. he was quieter; breathing central, almost Cheyne-Stokes. Pupils contracted, anæsthesia still universal. Urine presented no special features. He had a few spasms of muscles during the earlier part of the day; toward evening the anæsthesia was passing off. The excitement consequent on the visit of some friends determined a slight return of convulsions and anæsthesia during the night. The removal of the offending tooth on the following morning gave rise to a few slight convulsions, after which recovery was rapid. Temperature remained down throughout.

Diabetes Mellitus of Syphilitic Origin.

Feinberg (*Berliner klin. Wochenschr.*, 1892, Nos. 6 and 7) has reported four cases of diabetes mellitus in which there was evidence of the previous existence of syphilis, and in which improvement followed anti-syphilitic treatment.

The first case occurred in a man twenty-seven years old, who, in addition to

the symptoms o fdiabetes, presented narrowing of the right pupil, neuropathic dilatation of the bloodvessels, evidence of irritation of the vagus (as manifested by slowing of the heart), enlargement of the liver and spleen, ascites, anasarca, pains in the back, hypochondria, and extremities, with consecutive anæsthesia of the upper extremities and of the back from the seventh cervical to the twelfth dorsal vertebra, and paralyses of the bladder. The knee-jerks were absent. Evidence of a cerebral lesion was wanting. Improvement followed anti-syphilitic treatment, but the patience of the man gave out and he disappeared from observation. It is thought that there existed a syphilitic spinal meningitis, as a result of which the sensory roots of the spinal nerves and the rami communicantes of the last cervical and first dorsal ganglia of the sympathetic suffered compression. It has been shown that section of the last cervical or first dorsal ganglia of the sympathetic or of the last cervical or first dorsal nerve may give rise to diabetes.

The patient in the second case was a man, twenty-eight years old, who presented successively syphilis, gastro-intestinal catarrh, thirst, polyuria, glycosuria, focal epileptiform seizures, followed by transient hemiparesis. The symptoms were entirely dissipated by anti-syphilitic treatment. In this case it is considered probable that syphilitic endarteritis developed in the region of the diabetic centre on the flow of the fourth ventricle, with perhaps the subsequent formation of a gumma in the motor cortex.

The third case occurred in a woman twenty-eight years old, who, following syphilitic infection and emotional shock, became hysterical, and developed headache, with nocturnal exacerbations, often accompanied by nausea and vomiting. Then symptoms of bulbar palsy appeared, with paralysis of the levator palpebræ, and finally diabetes manifested. Striking improvement in all of the symptoms followed anti-syphilitic treatment. The most plausible explanation of the symptoms and the course they pursued lies in syphilitic narrowing of the vessels supplying the floor of the fourth ventricle.

In the fourth case the patient was a woman, thirty-one years old, of whose thirteen brothers and sisters but one was living. When nineteen years old she suffered from ulceration of various parts of the body, continuing for a period of four years. She had borne five children, two of whom survived. For five years there had been constant headache, worse at night, preventing sleep and intensified in paroxysms. For four years there had been excessive thirst, the patient drinking eight or ten pints of water during the night alone. Vision began to fail. Weakness of the left half of the body, of arm, leg, and face, developed. Left lateral hemianopsia appeared. Sensibility was preserved. The right pupil was dilated; it reacted feebly to light. The cutaneous reflexes were normal. The patellar reflex was exaggerated on the left side. The sphincters were uninvolved. The urine contained one-half per cent. of sugar. Mercurial inunction was followed by salivation. Potassium iodide was not well borne. The left pupil became dilated; its response to light was lost. The hemianopsia extended to the right half of the visual fields. The patient became dissatisfied and withdrew from treatment. The conclusion was arrived at, that the symptoms were dependent upon a gumma at the base of the brain in the region of the optic chiasm, associated with syphilitic endarteritis of branches of the Sylvian artery.

The Changes in the Blood in Disease.

Sadler (*Fortschritte der Medicin*, Bd. x., 1892) reports the results of a large number of observations made at the clinic of v. Jaksch, at Prague, upon the blood in various pathologic conditions. It appears that the number of red corpuscles is diminished, though, as a rule, not considerably, in the course of acute disease. In chronic disease, especially when cachexia develops, the diminution may be decided. Under the same conditions, the hæmoglobin suffers a diminution relatively greater than that of the corpuscles. To these generalizations, tuberculosis, especially if the patient be well nourished, and valvular disease of the heart, especially mitral disease, may constitute exceptions. In some cases of chlorosis, the number of red cells may for a long time be almost normal, while the proportion of hæmoglobin is considerably diminished. On the contrary, in cases of anæmia there is decided diminution both in the number of red corpuscles and in the proportion of hæmoglobin. The greatest diminution in the number of red corpuscles occurs in pernicious anæmia, though almost as profound a change may be observed in the case of anæmia following hemorrhage or resulting from other causes, such as atrophy of the glands of the stomach. In cases of pernicious anæmia, Sadler failed to find the hæmoglobin in relatively greater proportion than the number of red corpuscles. In cases in which as a result of acute, profuse diarrhœa, the consistency of the blood was augmented, the number of corpuscles and the percentage of hæmoglobin were increased. A similar condition appeared in some cases of enteric fever. In untreated cases of malarial fever, the number of white corpuscles is increased. Physiologically, leukocytosis is present during digestion. Leukocytosis is also present in the puerperal state, at least for twelve days following labor. The white corpuscles are usually in excess in acute diseases attended with exudation, viz., pneumonia, pleurisy, peritonitis, pericarditis, meningitis, polyarthritis. It seems likely that there is a relation between the character of the exudation and the presence or absence of leukocytosis. If leukocytosis appear in the course of enteric fever it must be considered as evidence of the existence of a complication. Leukocytosis occurred in pulmonary tuberculosis only after injections of tuberculin. Leukocytosis was present in a minority of cases of carcinoma. Four cases of sarcoma presented leukocytosis. There was little or no excess of leukocytosis in three cases of lymphadenitis.

Cactus Grandiflorus in Cardiac Diseases.

R. W. Wilcox (*The Post-Graduate*, New York, vol. vii., No. 3, 1892) has made a clinical study of cactus grandiflorus in morbid conditions of the heart. He uses a fluid extract made by a particular firm, giving doses of from 10 to 30 minims. From the careful study of twenty-three cases, the author concludes that the drug has no cumulative action, that it is somewhat slow in its results, about six to twenty-four hours being required before its full physiological action is obtained, except in cases of tachycardia, when two hours are sufficient. It does not interfere with digestion, and its effects upon the urinary and respiratory system are the results of its action upon the heart.

The conditions in which it is especially useful are: First, cardiac weak-

ness, when the heart has not acquired compensation for valvular lesion, or when compensation has been destroyed by muscular degeneration. Secondly, functional cardiac diseases, including, among others, disturbances arising from tea, coffee, tobacco, and alcohol, and the irritable hearts, of which palpitation is of emotional origin. Thirdly, slow hearts, when there is over-stimulation of the pneumogastric, or marked degeneration of the muscular wall of the ventricle—hearts in which digitalis is absolutely counter-indicated.

In all cases the tension of the pulse is increased, but its breadth is unaltered, so that the work of the heart is not made greater by contraction of the arterioles, the increase of tension being due to the fact that more blood is propelled through the arteries; thus prompt relief is afforded to venous congestion.

In old rheumatic hearts pain is relieved because the incompetency is relieved, and this is a guide for the administration of the drug in valvular lesions.

In aortic regurgitation it is the drug *par excellence*, having all of the benefits and none of the dangers of digitalis in that condition. In mitral stenosis it is absolutely contra-indicated, as, owing to the shortening of the diastole, sufficient blood cannot flow into the ventricle to permit of an efficient systole.

The author believes that with the intelligent use of cactus in suitable cases, we shall have greater success than with any other drug in use for diseases of the circulatory system.

SURGERY.

UNDER THE CHARGE OF

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SURGICAL ANATOMY OF THE PELVIS OF THE KIDNEY, AND ITS EXPLORATION.

LEGUEU (*Ann. des Mal. des Organ. Génito-urin.*, 1891, vol. ix., Nos. 6 and 7) directs attention to the normal anatomy of the pelvis of the human kidney. In the last few years incisions into the kidney or its pelvis for the removal of concretions have become more frequent. It is conspicuous, during these operations, that the pelvis of the kidney, in most cases, does not correspond with the descriptions of anatomists, and that the funnel-shaped pelvis is

often wanting. The author has found in his investigations that the ampulla-form pelvis exists in only a limited number of cases. Usually the pelvis of the kidney is branched—that is, the ureter divides, without previously bellying, into the tubes that connect with the calyces of the kidney. Transition forms are often seen between the ampullar and ramified forms. The author, in common with other writers, states that the posterior part of the pelvis is always devoid of vessels.

The internal exploration of the kidney is next discussed. Two methods are open to the operator—either an incision into the pelvis, or an incision into the kidney substance itself. If the kidney is not enlarged, exploration of the pelvis with the finger is scarcely possible, because under normal conditions it is much too small. Different authors, therefore, use for examinations sounds which are introduced through small incisions in the pelvis. It is clear that the sound can in no way replace the palpating finger, especially in the parenchyma of the kidney, as encapsulated stones could scarcely be detected in this manner.

For the investigation by cutting into the kidney substance, Morris recommends an incision on the posterior surface of the organ. This is not to be advised, however, as one is never secure against free hemorrhage, and by this cut a great number of secreting elements are divided and destroyed; besides, a satisfactory examination is impossible. The incision usually preferred is that on the convex border of the kidney. In this operation severe hemorrhage and destruction of secreting elements are avoided. The condition of the kidney can be made out as far as its middle portion is concerned, but above and below the examination is unsatisfactory, inasmuch as the cut cannot exceed a certain limit. The author, therefore, suggests two incisions, one on the upper part of the convex border, and the other on the lower part of it. It is then possible to determine satisfactorily the condition of the corresponding part of the kidney through these cuts, while if a finger be introduced into each incision at the same time the middle portion of the organ can be carefully palpated.

[In *The Dublin Journal of Medical Science*, for February, 1892, DR. T. MYLES protests against the "loose and unscientific way in which anatomical names are used" in articles like surgery of the kidney. He adds, as an example of what he criticises, that one writer says: "I cut into the pelvis of the kidney from the front," and continues, "Now he could not do this, because the kidney has no pelvis, and if his statement means that he cut into the pelvis of the ureter from the front," it would indicate the recklessness of anatomical ignorance, as the renal veins and arteries completely conceal nine-tenths of the pelvis."

The expression "pelvis of the kidney," as used by surgical writers, although possibly open to anatomical criticism, indicates accurately the general space within the sinus into which the calyces open. Gray speaks of the pelvis "merging into the ureter proper." Jordan Lloyd says: "When the kidney is exposed through a lumbar wound, I puncture its lower end with a long-bladed tenotome, in a direction upward and inward, making for the current of the calyces. . . . Into this opening I pass a child's bladder-sound, and systematically explore the whole interior of the pelvis." Treves says: "The stone may be lost in the rush of fluid which escapes when the pelvis

of a much distended kidney is opened." Morris says that a calculus may grow "in one of the calyces or in the pelvis of the kidney," and frequently speaks of the "renal pelvis." Jacobson, Thornton, and others speak of incisions into or through the "pelvis of the kidney."

It seems unnecessary, therefore, to reject the term which applies to a strictly defined anatomical and surgical region, even though we may, with Dr. Myles, question the possibility of safely opening it "from the front."—J. W. W.]

Intermittent Hydronephrosis.

Terrier and Baudouin, in a study of this subject (*Revue de Chirurgie*, 1891, No. 12), arrive at the following conclusions: The intermittent variety of hydronephrosis has been little known until recent years, and appears to be more frequent than is generally thought.

This clinical variety has its origin in several different lesions. In the great majority of cases it constitutes a complication of displacements of the kidney. It is more frequently observed in females than in males, and is more common on the right side in women, while the left kidney seems oftener affected in men.

Occasionally the origin of the trouble is a calculus in the pelvis of the kidney, at other times a compression or temporary obliteration of the lower extremity of the ureter, while, in other cases, it is of congenital origin. It is also produced in the movable kidney by bending of the ureter, with or without torsion, at the time of the displacement. There is momentary arrest of the secreted fluid, with the formation of a hydronephrotic pocket, which empties itself as soon as the kidney resumes its normal position. Other causes are peripyelitic irritation, due to circulatory disturbance or to infection of the mucous membrane of the pelvis, and fibrous adhesions, whereby the sac is united to the upper part of the ureter, transforming an intermittent into a permanent hydronephrosis.

The alternations of filling up and evacuation of the pelvis of the kidney, due to the temporary obliteration of the ureter, can be explained clinically by the characteristic painful attacks, coming on in the course of a more or less altered state of the health, occurring at intervals of about a month, or sometimes oftener. These attacks, which present three stages—the beginning, the acme, and the terminal phase—are characterized by intense pains, sometimes intolerable, coincident with the appearance of a fluid tumor, rarely fluctuating, situated in most cases in the right flank, with a notable diminution in the quantity of urine voided.

These are the consequences of an abrupt flexion of the ureter, following the displacement of the kidney. Each crisis lasts several hours, and suddenly ceases when the kidney resumes again its normal position. The tumor disappears with the pains, and there is a considerable discharge of urine—the pelvis has emptied itself. Hydronephrosis, beginning in this way, may remain intermittent for a long time, may remain stationary, or may become aggravated during pregnancy. After a time, the collection becomes infected, the urine is purulent, and the dangers incident to this condition present themselves.

For the painful crises medical measures may be tried. If there is renal mobility nephrorrhaphy is advised. When there is permanent hydronephrosis which tends to progress, more radical measures are demanded. Tapping is to be rejected. If the lesions are double, it is recommended to make on the side most affected a fistula of the pelvis, but if the other kidney is healthy, it would be better to do at once a nephrectomy, as, if the surgeon is content with draining the cavity, a secondary nephrectomy will probably be necessary.

Excision of Stricture of the Deep Urethra and Urethroplasty for Radical Cure.

Keyes reports (*Journal of Cutaneous and Genito-urinary Diseases*, vol. ix., No. 11) a case successfully treated by this method. He divides strictures of the deep urethra into the soft, the cicatricial, and the inodular. The first of these, he claims, often yields permanently to dilatation, and the cicatricial to thorough division on the floor and roof of the canal, while the inodular is incurable radically without excision, with or without transplantation of foreign tissue.

The case reported is that of a man, aged sixty years, first seen by the author July 24, 1890. Twenty-eight years previously the patient had fallen across a beam, rupturing his urethra, with the usual symptoms—retention, abscess, infiltration, perineal fistula, etc. There had been no previous gonorrhœa. Perineal section was done at the time of the accident, but close recontraction followed.

When seen by the writer, a fine filiform instrument was with difficulty passed into the bladder, which the urethra clasped tightly. Urine was being constantly passed with great straining, largely through the perineal fistulæ. The stricture was laid open on the filiform guide. The contracted portion began in front of the bulb, and extended back under the pubic symphysis. The stricture was a dense fibrous cord with a minute central calibre, as large as a crow-quill and one and a half inches long. After division, the stricture immediately sprang together, owing to its density and elasticity. It was evident that it would be impossible to keep this passage open, and Monsel's suggestion of excision and transplantation of the inner layer of the prepuce was adopted. The patient had an abundant foreskin, which was disinfected and wrapped in hot bichloride compresses. The stricture was carefully dissected out, and by means of hot applications and pressure the bleeding was arrested. A piece of the inner layer of the foreskin, one and one-half by two inches, was rapidly removed and cleansed, placed for a moment in warm boric acid solution, and sutured in place in the roof of the gap left by the removal of the stricture. Four catgut sutures were used to attach it to the healthy urethra anteriorly, and several lateral sutures were also applied; no sutures were placed posteriorly, as it was impossible to reach the prostatic urethral end.

A large drainage-tube was passed into the bladder from the perineal wound, and a soft rubber catheter passed through the entire length of the urethra. The parts were dusted with iodoform, the catheter and tube made to press the transplanted mucous membrane in place, gauze packing applied, and retained by a T-bandage.

On the fifth day the dressings were removed, and the flap was found to be alive and adherent everywhere, except along the anterior edge and one anterior angle. The parts were repacked, and all dressings, including the vesical tube, were removed on the eighth day. The perineal wound healed promptly, and in the middle of the third week the patient went home, a distance of one hundred and sixty miles, with instructions to pass a 32 Fr. steel sound once a week. The patient, however, used a 21 Fr. sound, as he thought this large enough. Three months later he was seen, and reported himself perfectly well. At this time a 27 Fr. blunt sound disclosed a moderate linear obstruction at each end of the transplanted flap. The patient could hold his water half a day and all night, which he had not done for years before, and he had gained twenty pounds. He was seen again in September, 1891, and has remained perfectly well; urinates in a full stream, urine clear and free from shreds or pus. He had continued to pass a 21 Fr. sound once a month.

Stricture of the Œsophagus.

Newman (*Lancet*, London, vol. i., 1892, No. 5) writes at length on strictures of the œsophagus.

The diagnosis of organic stricture can usually be made without difficulty. The history of injury followed immediately by painful deglutition, which passes off in a few days or weeks, and which is followed at some remote period by a constantly increasing dysphagia, without pain, hemorrhage, or lymphatic enlargements, would point to organic stricture. In many cases, however, a clear history cannot be obtained, the patient not having knowledge of, or having forgotten, a previous injury. The mischief may even have happened while the patient was under the influence of alcohol, or during a fit of insanity.

On the other hand, a carcinoma may develop in a case in which there is a clear history of traumatism, but, as a rule, it is more apt to be protracted irritation which is responsible for malignant growths. Especial stress should be put upon the absence of pain, hemorrhage, and enlarged lymphatic glands in non-malignant cases. As carcinoma may exist, however, without these symptoms, the history of the case must be carefully reviewed, the age of the patient considered, and the character of the dysphagia and of the discharges noted.

Tertiary syphilis may manifest itself in a dysphagia, due either to the formation of a gumma, or to the contraction of an old lesion.

The author questions the existence of spasm of the fibres of the muscular coat in an otherwise healthy œsophagus, but has found this condition in cases in which there was a local irritation. This may or may not be associated with some other general or local condition which, if present, will also demand attention.

The prognosis in carcinoma of the œsophagus depends upon the seat of the growth—whether it is in a position in which surgical intervention is possible. If operation is not done, death will sooner or later inevitably occur, usually from starvation. If the new-growth begins in the upper part of the gullet, the disease is apt to be rapidly fatal. On the other hand, carcinomatous growths of the lower end of the œsophagus may run a very slow course. The hard will be very much more chronic than the soft variety of cancer.

Dr. Newman has collected the statistics of 556 cases of carcinoma of the œsophagus in which the mode of death was given, with the following result: Collapse and exhaustion, 390; inflammation of the lung, including gangrene, 91; pleurisy, 53; peritonitis, 17; perforation into heart, or bloodvessels, 15.

In benign tumors of the œsophagus the prognosis will depend upon their location, size, and rapidity of growth, and whether or not their removal is possible by operation. If situated high up, they may be cut off or ligated; or, if pedunculated and soft, the parasol-probang may dislodge them. In those cases in which operation is impossible, the seat of the growth and the probability of its interference with other functions must be considered in giving a prognosis.

Organic strictures, if seen early, may yield to dilatation with bougies. If a bougie can be passed, the prospect of recovery is good; but, if the constriction will not admit one of these instruments, gastrostomy becomes imperative.

A Contribution to the Surgery of the Œsophagus.

Gerster, in a study of the surgery of the œsophagus (*New York Medical Journal*, vol. lv., No. 6), presents the following conclusions: If a foreign body becomes lodged in the œsophagus, and cannot be displaced downward into the stomach or extracted without the employment of much force, it is imperative to perform external œsophagotomy at once. This operation, as now practised, is comparatively safe; its mortality for all classes of cases is given by Fischer as 20 per cent. The operation may be difficult if the case is complicated by a goitre or other cervical tumor. The conditions are parallel to those of strangulated hernia—an early operation is safe, a late one dangerous and often useless. Delay extending over twenty-four hours is never justified, and, if at the end of this period extraction by bloodless processes is not easy, the gullet should be incised at once.

If impaction has existed for more than twenty-four hours, frequent and persistent efforts at dislodgment are apt to be more dangerous than œsophagotomy, inasmuch as the patient's condition is apt to be bad from fever and starvation, while the manipulations in the fauces and œsophagus provoke nausea and vomiting which are depressing, and the risk of causing traumatic perforation is considerable.

In performing œsophagotomy, the incision should be made large enough to permit of comfortable manipulation without much traction. Blunt dissection is to be avoided, as the tissues are less viable and succumb to septic influences more easily when torn than when cut. The line of the incision is just in front of and parallel with the anterior border of the sterno-mastoid muscle, beginning a little below the cricoid cartilage and extending to the sternal insertion of the muscle. The omohyoid is drawn aside and the lateral margin of the thyroid gland is exposed to act as a guide. The great vessels with their sheath are to be drawn backward with the sterno-mastoid muscle. Dissection should proceed between two mouse-toothed forceps so that vessels in the line of the incision can be recognized and secured before being cut. If the sternal portion of the sterno-mastoid muscle is in the way, it may be cut. Care must be taken not to injure the recurrent nerves. The œsophagus may be recognized by its longitudinal fibres. If there is doubt, a urethral

sound may be introduced through the mouth and the incision made on the point of this instrument. Fillets of silk passed through the edges of the cut facilitate manipulations within the gullet.

In the absence of septic complications which would usually be the case if early operation was performed, the edges of the œsophageal wound should be stitched with fine silk. The outer wound is to be packed loosely with iodoform gauze. A few silkworm-gut stitches may be introduced into the cutaneous edges of the wound, which are not to be brought together, however, until after the removal of the packing.

Alimentation by the mouth is permitted at once, liquid substances only being given, and in small quantities, which are to be swallowed while the patient is on his right side. Minute leakage frequently occurs, but this does not interfere with the prompt healing of the wound.

In those cases in which ulceration or sloughing has occurred, suture is not usually practicable, and is rarely safe. The wound should be packed and allowed to heal by granulation. The stomach-tube will probably be necessary in these cases, and may be inserted either through the wound, mouth, or nares.

Two cases are detailed in which the operation was performed; both recovered.

OBSTETRICS.

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The Prophylaxis of Puerperal Disease.

The question as to how far obstetric patients can be safely utilized in the study of obstetrics is still under debate, two opinions prevailing: one, that the use of such material is only safe when antiseptic injections as well as external antisepsis are employed; the other, that all injections and internal examinations are unnecessary and injurious. Frommel, of Erlangen, in an obstetric service of between five and six hundred patients, followed a line of treatment which embraced vaginal injections with bichloride solution, 1 to 2000. His clinic was open to about one hundred students, and in connection with the hospital there is a school for the training of midwives. He computes that in abnormal cases, where a thorough study of the case was necessary, from sixty to seventy examinations during the patient's stay in the hospital were found requisite. So long as he continued to employ prophylactic injections, he had no case of sepsis whose origin could be ascribed to his clinic. His morbidity rate varied from five and a half to seven and a half per cent. He was led for purposes of comparison to abandon the prophy-

lactic injections, relying entirely upon external disinfection, when several cases of puerperal sepsis occurred, originating in the clinic, and his morbidity rate rose to eleven and one-tenth per cent. He believes, then, that proper instruction cannot be given without internal examinations, and that such can only be employed safely when prophylactic injections are used.—*Deutsche medicinische Wochenschrift*, 1892, No. 10.

The Results of Two Hundred Labors without Internal Disinfection.

Mermann has continued in the clinic at Mannheim his usage in conducting labors without internal disinfection, and records in the *Centralblatt für Gynäkologie*, 1892, No. 11, the results in 200 recent cases. He had but one death, and that from rupture of the uterus complicated by placenta prævia and a large amount of amniotic liquid. In the 200 cases there were 36 which presented complications of greater or less gravity. These cases complete a series of 700, presenting no death from septic infection. The morbidity rate was 6 per cent. In the last 200 cases there occurred but 2 cases of mild ophthalmia, and in all less than 10 cases of conjunctivitis were observed among infants. Mermann's practice is to omit injections, and, whenever possible, to also omit internal examinations, relying upon palpation and auscultation and a close observation of the case.

Subacute Endometritis in the Latter Months of Gestation.

Löhlein reports in the *Centralblatt für Gynäkologie*, 1892, No. 11, the case of a woman, aged forty-six years, who had borne a number of children. She was admitted to the clinic suffering from endometritis following an abortion; was treated by curetting, and discharged as recovered. She returned near the end of her next pregnancy, complaining of a chill, followed by fever, prostration, and obstinate pain. The pain was worst upon the left side of the patient's abdomen, and radiated over her body. On examination the abdomen was found painful, the uterus sensitive to pressure, especially upon the right side. Clonic contractions of the uterine muscle were present; the membranes were tense, but dilatation was proceeding slowly. Her fever was remittent in character, and persistent, with diminution of sleep and appetite during an entire week. Labor pains finally ensued, and a living child was born. The placenta was retained, and when the hand was introduced it was found to be completely adherent in the right half of the uterus. There were no infarcts in the placenta, but old, thick, and brownish extravasations of its uterine surface. The delivery of the placenta was followed by cessation of pain and rapid recovery.

Two Hundred Cases of Eclampsia.

At a recent meeting of the Berlin Medical Society, Olshausen gave the results of his study of two hundred cases of eclampsia which have been reported in a number of medical journals, among them the *Prager medicinische Wochenschrift*, 1892, No. 10. As is often observed in hospital practice, his cases came in series, the larger portion of them between September and Feb-

ruary. Most of them were primiparæ, and especially those older than the average. Twin pregnancy was also a frequent cause. The frequency of eclampsia, Olshausen estimates as greater than twenty-five per cent. of all cases. Thirty per cent. of premature labors, he thinks, are caused by eclampsia. In five cases out of two hundred, pregnancy was not interrupted by this complication. It is rare for eclampsia to persist after a brief period of the acute disorder.

As prodromal symptoms, were observed headache and, more important, gastric pain with frequent vomiting. Amaurosis was rarely observed. In three cases an aura was present.

Albumin was almost invariably present in the urine. Casts were often found, œdema rarely, and icterus was observed twice.

Twenty-five per cent. of the 200 perished, and post-mortem examinations were obtained in 37 cases. Acute affections of the kidneys were found in 22 of these; chronic interstitial nephritis in 4. The remainder showed a mixture of acute and chronic diseases; in 2 cases the kidneys were unchanged. In 6 cases a ureter was dilated, but not to a pathological extent. Nine patients died before the end of labor, and labor was terminated by Cæsarean section in one patient, and the life of the child was preserved. Most fatal cases terminated in four days after the first convulsions, although convulsions occurred as late as the thirtieth or fortieth day after labor. The complications causing death were sepsis and pneumonia, eclamptic patients being especially susceptible to septic poison.

Regarding prognosis, it is often favorable where convulsions begin soon after the birth of the child. Frequent convulsions, rise in temperature, small and frequent pulse, are signs of a fatal issue. Twenty-eight per cent. of the children born at term died. This result is sometimes owing to morphia-intoxication, where large doses of the drug have been given.

As regards the treatment of eclampsia, Olshausen depends upon morphia, chloral, and the use of the forceps. Version is contra-indicated, and chloroform should be used only where the convulsions recur regularly. The intoxication theory of eclampsia seems most probable, and an interesting analogy is shown between the lesions of eclampsia and those of sublimate-intoxication.

Experimental Researches in a Case of Puerperal Nephritis.

In the *Archives de Tocologie*, 1892, No. 2, Charpentier describes the case of a patient taken with infectious nephritis after labor. Her temperature was high, she had frequent chills, and albumin in the urine. With a view to determine the cause of this infection, examinations were made of the blood and the urine, and culture experiments were employed which gave negative results. An effort was then instituted to test the toxicity of the patient's urine, and, following Bouchard's methods of experiment, rabbits were inoculated with the urine, which was injected into the marginal vein of the ear. The injections were followed by tetanic convulsions and speedy death, respiration stopping before the heart failed. Rigor mortis developed rapidly, the animal remaining in the posture assumed in the moment of death. On examining the kidneys, ecchymoses were present beneath the capsules. On

section, the organs were pale and anæmic; the urine of the animal taken at the moment of death was slightly albuminous. Microscopic examination of the kidneys of the animal showed nothing but acute congestion. Injections of the patient's urine under the skin of other animals resulted in the same manner, with the exception that death occurred after a longer interval.

Regarding the clinical history of Charpentier's case, the patient did well for eight days after labor, when chills and fever supervened; no lesion could be found of the genital tract, and involution of the uterus continued with regularity. The lochia were normal. Vigorous antiseptic treatment was at once employed, and it was not until the thirty-fourth day after labor that albuminuria occurred, accompanied by symptoms of uræmic intoxication.

Tubal Abortion; Intra-peritoneal Bleeding; Laparotomy; Recovery.

Jahreiss reports in the *Münchener medicinische Wochenschrift*, 1892, No. 9, the case of a woman who had borne two children, who complained of profuse irregular bleeding persisting for two months, and occurring about every two weeks. Pain was also present, the patient stating that her menstruation had been profuse since the birth of her last child, when a midwife had delivered an adherent placenta. An examination revealed the uterus nearly normal; the right Fallopian tube showed dilatation. The left tube was normal. The patient was put at rest, given fluid extract of hydrastis, and an ice-bag placed upon the abdomen. This treatment failed to relieve the pain or check the hemorrhage, and finally a slight elevation of temperature with a rise of pulse to 120 was observed. The symptoms were those of rupture of a tubal sac, although collapse, subnormal temperature, and profound anæmia were absent. Upon opening the abdomen blood was found in the pelvis, and tubal abortion upon the right side was discovered. The patient recovered without complications. The right tube and ovary were removed, and the abdomen cleansed. On examining the tube clotted blood was found in it, but the ovum could not be distinguished. Rupture had occurred, although the orifice of the rupture was partly closed by the clot.

The Question of Craniotomy.

In the *Archiv für Gynäkologie*, Band xli. Heft 3, Bársony contributes an interesting paper on "Craniotomy," based upon 46 cases occurring during the last sixteen years in the obstetric clinic at Budapesth. The mortality in these 46 cases was 8, or $17\frac{3}{10}$ per cent.; the causes of death were rupture of the uterus in 4, septic infection in 4; in only 1 case did the infection occur after admission to the clinic, which reduces the mortality for which the clinic was responsible to 1 out of 46 cases, or $2\frac{1}{10}$ per cent. The cases are reported in detail, and the arguments for and against craniotomy and the Cæsarean section are fully stated. The recent literature of the subject is clearly summarized, and Bársony concludes that the Cæsarean operation is not one which the average practitioner can perform with safety in the ordinary dwelling of the poorer classes. He accepts the most favorable statistics of the Cæsarean operation—namely, those of Leopold, of Dresden, who has

a mortality of 8 per cent. Bársony concludes that when the *conjugata vera* is not less than seven centimetres that spontaneous labor is not impossible; that when the *conjugata vera* is six centimetres the Cæsarean operation is safer than embryotomy; but that when the *conjugata vera* is more than six centimetres, but the spontaneous expulsion of the child fails, unless the patient be in a hospital where she can have the advantages of the best surroundings, craniotomy should be performed. The patient should afterward be kept under observation, and labor should be induced in ample time to secure the birth of a living child. As in Cæsarean section, so in craniotomy, previous ineffectual attempts at delivery with forceps seriously damage the mother's chances for recovery.

Tubal Abortion: a Criticism.

In the *Medical Press*, No. 2759, p. 285, Lawson Tait criticises the term "Tubal Abortion," and asserts that cases of supposed extrusion of the fœtus at the abdominal extremity of the tube are really cases in which the fimbriæ close over the ovum and become adherent to one another. The subsequent disseverance of the fimbriæ would constitute a rupture as complete as if the tube had given way one-eighth of an inch within the ostium. Tait considers the introduction of the term "Tubal Abortion" unnecessary, as the cases must be very rare, and dangerous as tending to lessen the gravity of the condition in the mind of the general practitioner.

GYNECOLOGY.

UNDER THE CHARGE OF

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What Effect does Electro-therapy have upon Fibro-myomata?

In a paper with this title (*Deutsche med. Wochenschrift*, No. 2, 1892) Martin and Mackenrodt report thirty-six cases treated according to Apostoli's method, with the following results: In no instance did the growth disappear. A positive diminution in the size of the tumor could not be demonstrated. Most of the patients, after several months' treatment, were relieved as regarded hemorrhages, and in some instances pain, but were usually obliged to resume the treatment. In upward of 40 per cent. of the cases electricity had no effect on the growth, and the general condition of the patient became worse. Three patients died while under treatment, two of septic peritonitis (in one laparotomy was performed, with removal of the suppurating tumor), and one of profound anæmia following repeated hemorrhages.

Analyzing the most recent statistics of Keith and Schäffer, the writers find that of 212 cases, in 32 per cent. the symptoms were relieved; in 44 per cent.

they became worse, and nine patients (4.3 per cent.) died. In no instance did the tumor disappear. Moreover, the so-called "symptomatic cure" was only permanent when the patient was near the menopause at the time of the treatment; before this period the hemorrhage frequently occurs.

Granting that electricity is a palliative means of treating fibroids, it remains to inquire why the results are so variable. The explanation is to be found in the histological peculiarities of the tumors in different cases. Thus among 356 cases treated by Martin in his private hospital, in 53 the tumor was cystic or malignant; in 23 there was accompanying disease of the uterus (cancer or pregnancy); in 43 marked disease of the adnexa. Since most of these complications could not be recognized before the abdomen was opened, it was evident that there was some risk in the electrical treatment. As regards the extirpation of the myomatous uterus, the writers report 20 cases of laparo-hysterectomy with 2 deaths (neither from sepsis), and 14 cases of vaginal extirpation, with no deaths. Including 5 successful cases of enucleation, the entire mortality is 5 per cent., as compared with 4 per cent. with the electrical treatment. Considering the difficulty, loss of time, and discomfort to the patients attending the latter, and the fact that in more than a third of the cases they become worse, the writers have entirely abandoned it. Fibroid tumors which give rise to only slight symptoms receive no local treatment at all. If serious disturbances are present the patients are operated upon.

Gonorrhœal Infection in the Female.

Bumm (*Münchener med. Wochenschrift*, No. 50, 1891) reports further progress in the study of this subject, based upon observations in 132 cases. He concludes that gonorrhœa in the female genital tract runs the same course as in other mucous surfaces, *i. e.*, that it is a superficial inflammatory process. So long as the discharge contains gonococci it is immaterial whether the source of infection is an acute or chronic urethritis. Within twenty-four hours after they have been deposited in the vagina the cocci multiply and invade the interstices of the epithelial layer, producing an intense irritation of the papillary bodies, which is partly mechanical and partly chemical, the latter being due to their toxæmic products. In consequence of the resulting inflammation the epithelial layer is destroyed; but the microbes do not extend any deeper into the submucosa. The epithelia begin to be reproduced in from five to ten days, and after this process is complete the cocci are only found in the secretion on the surface, where they continue to grow for months afterward. The resistance offered by the new layer of epithelium is not a positive bar against fresh invasion of the deeper tissues, which may occur when from any cause (such as menstruation or sexual excess) swelling and round-cell infiltration of the mucosa occurs; the recurrence may simulate fresh infection, though the symptoms are less acute. Gonococci may live and be reproduced for months and *even for years* in the secretions of the female genital tract, and as long as they are present there is always a possibility of transmitting infection, as well as the danger of extension to healthy portions of the tract—the patient is not cured. Gonococci, unlike other specific microörganisms, have no relation to septic processes, and, though they give

rise to acute inflammation, they are unable to invade the connective tissue extensively and to cause suppuration in the same. The writer has never been able to cause suppuration by injecting pure cultures into the arm of the human subject. When gonococci are found in the pus in ovarian abscesses it may be that the abscesses arose from the primary infection of Graafian follicles rather than migration of the organisms through the wall of the adjacent tube, as suggested by Wertheim, reasoning from the behavior of other septic germs. In cases of apparent septic infection of the pelvic connective tissue following gonorrhœa pyogenic microbes are also found, showing that mixed infection is present. This is comparatively rare, even in puerperal cases, in which the conditions seem to be most favorable.

The different structure of the mucosa in different portions of the genital tract explains certain variations in the course of gonorrhœa. Those parts are most susceptible to infection in which the epithelium is delicate, because such epithelium (especially the columnar variety) offers less resistance to the invasion of the cocci. Hence the great susceptibility of children, and the fact that the urethra and cervix uteri are the favorite seat of infection in the female. As the mucous membrane is here disposed in folds, in which the germs are retained, not only is the affection rebellious to treatment in these localities, but it tends to become chronic; the ordinary antiseptic and astringent applications only reach the upper surfaces of the folds and not the depressions.

In conclusion, the writer emphasizes the fact that real danger from gonorrhœa, and serious local and general symptoms, only arise when the infection extends above the os internum.

Cocaine-poisoning in Minor Gynecological Operations.

Lorenz (*Centralblatt für Gynäkologie*, 1891, No. 51) has not been successful with cocaine-anæsthesia. In one case he applied a 20 per cent. solution to the endometrium without diminishing its sensibilty. In three other cases he injected a 4 per cent. solution into the portio vaginalis, with the following results:

Case I. One-third of a grain of cocaine was injected into the portio previous to curettement. In half a minute the patient had a general sensation of coldness, and was very restless. The pulse was 150, and the respirations became rapid. The pupils were dilated, convulsions followed, and she became unconscious. Nearly two quarts of urine were passed. The symptoms were relieved by inhalations of chloroform, but recurred in a few minutes, being again relieved by inhalations of amyl nitrite. A third attack was relieved in the same way, after which the patient slept for an hour, and awoke complaining of thirst, a burning sensation in the throat, and contractions of the limbs. She felt perfectly well on the following day, but the polyuria persisted for a month.

Case II. One-sixth of a grain of cocaine was injected as before. Exactly half a minute later the patient became restless, complained of coldness and contractions of all her muscles, thirst, and burning in the throat. Pulse and respiration were accelerated, and the patient could not stand. She was revived by a cup of coffee, and the operation (curetting) was completed. Polyuria persisted for two days.

Case III. One-eighth of a grain was injected into the portio previous to discission, with the same results as in Case II. The writer adds that a hysterical element may have been present in the first case.

Sarcoma Uteri.

Geiser (Inaug. Dissert.; *Centralbl. für Gynäkologie*, 1891, No. 51) states that only eight cases were observed at the Breslau Clinic in the course of ten years. He calls attention to the fact that intra-mural sarcoma has nearly the same symptoms as fibro-myoma, hence the differential diagnosis is difficult. Sarcoma of the endometrium, on the other hand, rapidly degenerates, causing a foul discharge and cachexia. Metastasis is rare, and the duration of the disease is accordingly long—even four years. The prognosis is absolutely bad, and a radical operation should be performed as soon as the diagnosis has been established, which can only be done by the aid of the microscope.

[The writer's observations, based on a small number of cases, are not entirely in accord with those of other observers, especially as regards the duration of the disease and the frequency of metastasis.—H. C. C.]

Terrillon (*Centralblatt für Gynäkologie*, 1892, No. 7) calls attention to an important diagnostic point in connection with interstitial sarcoma—the rapid growth of the tumor associated with unimpaired general health. In sarcoma of the endometrium thorough curetting and cauterization results in prolonged relief from the symptoms, but neither the palliative operation nor vaginal hysterectomy affords a positive protection against recurrence.

The Relation of Influenza to Diseases of the Pelvic Organs.

Gottschalk (*Centralblatt für Gynäkologie*, 1892, No. 3) noted that during the epidemic of 1890 acute hemorrhagic endometritis was not an unusual complication of influenza. In three instances he observed resulting parametritis, which he attributed to the direct influence of the specific poison of the disease upon the endometrium, the pathogenic cocci possibly reaching the pelvic connective tissue through the medium of the lymphatics, since the Fallopian tubes and peritoneum were not affected. In one case an old parametric inflammation was lighted up during an attack of influenza.

The Ultimate Results of Removal of the Adnexa.

Richelot (*Annal. de Gynécologie*, 1891) reports the after-histories of one hundred and twenty cases, which he classifies as follows:

1. Three patients with salpingo-oöphoritis were entirely cured, and one had persistent pain in the stump; 2. Out of thirty cases of cystic ovaries, twenty were permanently cured; the other patients suffered for a long time, but were finally relieved; 3. Out of thirty cases of chronic salpingitis with adhesions two patients were not relieved for several months, and one menstruated regularly after both tubes and ovaries had been removed; 4. Fifteen patients with disease of the adnexa complicated with retroflexion and adhesion were

permanently relieved; 5. Out of twelve cases of hæmato-salpinx and hæmatocele (ectopic gestation?) nine were cured; 6. Among twenty-seven cases of pyosalpinx with ovarian abscess one was cured, and several required a subsequent operation; 7. Thirteen operations for removal of the adnexa for the cure of fibroid tumors were successful, pain and hemorrhage being relieved while the growth diminished in size; 8. Normal adnexa were removed in three instances for the cure of hystero-epilepsy with good results, although in one instance melancholia with suicidal impulses persisted for a year and a half, the patient ultimately recovering.

The Relation of Influenza to the Growth of Intra-pelvic Tumors.

Leclerc (Inaug. Diss.; *Centralblatt für Gynäkologie*, 1892, No. 6) has made the following interesting observations based upon forty-four cases of uterine and ovarian tumors: In consequence of the increased pelvic congestion during the attack there is a distinct acceleration of the growth of the tumor which continues after recovery; by reason of the general depression of the system attending it, the vital activity of the normal cells is diminished and proliferation of the cells of the neoplasm goes on more rapidly. This increase in the activity of morbid growths is most marked also in cases of tuberculosis of the genitals and peritoneum.

The Anatomy and Physiology of the Fallopian Tube.

Milroy (*Glasgow Med. Journal*, 1891, No. 6) has made investigations, the results of which are somewhat at variance with the prevailing views. He describes glands in the mucous membrane lining the fimbriæ, which secrete a viscid fluid when the latter grasp the ovary, the function of which is to cause more intimate union between them, and thus to prevent the ovum from escaping into the peritoneal cavity. On account of the number of folds in the mucosa, it seems hardly credible, he thinks, that the ovum is forced along the tube by its vermicular contractions. It is more probable that the ovum is drawn into the ampulla by capillary attraction, assisted by the motion of the ciliæ. The inner end of the ampulla, where the folds are scanty, seems to be the most favorable locality in which impregnation could occur. When impregnated, the writer suggests that the ovum is impelled by a "nervous force" (*vis nervosa*) through the isthmus into the uterine cavity.

So-called Gonorrhœal Cystitis.

Du Mesnil (*Virchow's Archiv*, Bd. cxxvi., Heft 3) proves that there is no specific gonorrhœal cystitis, the presence of gonococci in urine withdrawn by catheter being due to the back-flow of pus from the urethra into the bladder. Moreover, these organisms do not cause decomposition of the urine, so that their occurrence in an ammoniacal specimen does not imply that they were the cause of the change. It is probable that the activity of the cocci is hindered, if not entirely destroyed, by the urine.

PÆDIATRICS.

UNDER THE CHARGE OF

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ASSISTED BY

THOMPSON S. WESTCOTT, M.D.,

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AN ASSERTED INFECTIOUS ORIGIN OF RHACHITIS.

MIRCOLI (*Gaz. degli Ospitali*, August 16, 1891, and *Deutsche med. Zeit.*, No. 80, 1891), in previous publications, has reported his discovery of the presence of staphylococci and streptococci in the nervous system in certain nervous affections, such as sciatica, chorea, and hydrocephalus. More recent investigations have enabled him to confirm this result in a new case of hydrocephalus, and, strange to say, in a case of rhachitis. Cultures made from scrapings from the bones of a rhachitic child are said to have given material for pure cultures of these pyogenic micrococci. The most notable point of difference from the results in the other cases was that the colonies of the streptococcus from the bone scrapings of the rhachitic case were not numerous.

The author supposes that in adults the pyogenic micrococci provoke local lesions, while in children they give rise to a general infection, which manifests itself more particularly in the organs that are the seat of greatest formative and functional activity, namely, the osseous and nervous systems.

GASTRO-INTESTINAL HEMORRHAGES IN THE NEWBORN.

In a recent clinical lecture, GRYNFELTT (*Nouveau Montpellier Médical*, 1892, No. 7, p. 125) gives a careful *résumé* of this interesting and rare accident. Such hemorrhages, he says, may be divided into two distinct classes, as they are primary and essential, or as developing in the course of an already existing affection, where they are merely symptomatic of the underlying disease. Considering only the first of these classes, it may be said that in the great majority of cases these hemorrhages take place during the first three days after birth (Rilliet, Silbermann, Dusser), though, in a case of the author's, it occurred on the fourth and fifth days, and in two instances, seen by Rilliet, the children were fifteen and twenty weeks old. Sex seems to play no special predisposing rôle, but the influence of morbid antecedents in the parents appears to be a factor of some importance. Pinard, Champetier, Auvard, and others have noted syphilis in the progenitors, but this is regarded by Grynfeltt as only a cause acting indirectly in deteriorating the health of the parents. Hæmophilia has certainly been proven in some instances.

The pathogeny of such hemorrhages is quite as obscure as the etiology. The lesions observed at autopsies are the most variable. Ulcerations of the stomach and intestines have been found; again, only a simple congestion;

while other cases have shown a complete absence of visible lesion. Setting aside the views of other writers, Grynfeltt advances a theory suggested by observations of Billard, and confirmed by personal studies, of the histology of the digestive mucous membranes of newborn infants. These show that the vascular supply of the mucous membrane of the stomach and intestine is exceedingly rich at this period of life. Adding, then, to this state of physiological congestion a congestion or impeded circulation in the liver, he finds it easy to ascribe to exaggerated tension in the portal area the cause of hemorrhages into the digestive tract. This view, he believes, is supported by the fact that these hemorrhages, at first sudden and profuse, quickly cease, thus resembling a true depleting loss of blood.

While vague prodromal symptoms have been described by some observers, notably by Rahn-Escher, it is certain that the first intimation of trouble is generally given by the appearance of the hemorrhage itself. Blood flows from the mouth following efforts at vomiting, or from the rectum, more or less mixed with feces or in clots; quite often both phenomena are coincident, hæmatemesis being usually the earlier. When one alone occurs, hæmatemesis is by far the more frequent. In spite of the gloomy prognosis evidenced by the statistics of Dusser (43 deaths in 78 collected cases), the author believes that a more hopeful view may be taken. The treatment recommended does not differ from that employed in hemorrhages in general. Tannin in syrup of rhatany offers an efficient astringent potion. One and a half to two and a half grains of ergotine in mucilage is employed with satisfaction by Widerhofer, of Vienna.

A Case of Complete Subcutaneous Emphysema During Whooping-cough.

Crocker (*British Medical Journal*, February 13, 1892) records a case exhibiting this very unusual accident. The patient was a boy between five and six years of age, suffering from an ordinarily severe attack of pertussis. Two days before he was first seen by the author, the mother noticed that after an attack of coughing the neck below the jaws was a little swollen. This swelling increased rapidly until, at the time of observation, the neck, cheeks, and chest, arms, legs, and trunk were swollen to an enormous size, resembling a series of huge bladders. The eyes were quite closed up, and the head and neck formed a uniform inflated mass. The scalp was blown out in front and at the sides, and the chest and back bulged out like great air-cushions. Death took place three days later. The rupture was supposed to have occurred in the mediastinum, whence, by way of the neck, the air readily traversed the entire subcutaneous tissue.

Splenic Anæmia in Children.

At a recent meeting of the Medical Society of London, Dr. Walter Carr (*British Medical Journal*, February 13, 1892, p. 336) presented a paper based upon thirty cases of splenic anæmia observed at the Victoria Hospital for Children. Sixteen were boys and fourteen girls, their ages varying between six months and two and a half years. They were usually wasted, and more or less anæmic in appearance. The spleen was enlarged, and in half the

cases reached the level of the anterior superior iliac spine. In many instances the liver showed some apparent enlargement, and the internal lymphatic glands were swollen. In the graver cases, hemorrhages and irregular fever were noted. The red blood-corpuscles were decreased in number, varying from 32 to 78 per cent. of the normal, with more or less deficiency in hæmoglobin; while the white corpuscles were slightly in excess, reaching a proportion averaging one white to a hundred red. Ten of the cases died of exhaustion or of intercurrent disease; six could not be followed up, and thirteen had either recovered or were improving. Only one, after two years, remained unchanged. Seven autopsies were obtained. In one case the spleen weighed only one ounce; in the others it varied in weight from four to eight and one-half ounces, the enlargement being seemingly due to a simple hypertrophy with some fibrous hyperplasia. No marked changes were found in any of the other organs. In fourteen cases there was either undoubted or probable evidence of congenital syphilis, and seven of these died; but in a large proportion of the other cases there was no evidence of specific taint, and, even in the most obviously syphilitic, the spleen and the anæmia were not affected by mercury, whence the conclusion that syphilis could be considered only as a predisposing condition. Rhachitis was also shown to have no direct causative influence. The author believes that the disease must be due to a separate cachexia, to which syphilis and rickets predisposed, but which required some other exciting cause. Mercury, arsenic, and quinine proved useless, but improvement sometimes followed the administration of large and increasing doses of iron.

The Etiology of Diphtheria.

Baginsky (*Berliner klinische Wochenschrift*, 1892, No. 9, p. 183) reports the results of careful clinical and bacteriological studies upon 154 cases of diphtheria treated under his supervision in the Kaiser- und Kaiserin-Friedrich-Kinderkrankenhaus. In 118 cases Löffler's bacillus was present, while in the remaining 36 only cocci (staphylococci and streptococci) could be demonstrated. The fatality of the disease in the former series (45—nearly 40 per cent.) is strongly contrasted with its mild course and the low mortality exhibited in the cases which were marked by the absence of Löffler's bacillus. Only 4 of the latter series died (11 per cent.), one with severe diphtheritic paralysis, another from complicating measles, and the remaining two from double empyema. These observations lead him to the following propositions:

1. There are two forms of the disease, which to the naked eye exhibit the same changes in the mucous membrane of the pharynx and tonsils. This condition is characterized by the appearance of a firmly attached dirty grayish-white false membrane upon the affected surfaces. Both forms are accompanied by fever, prostration of strength, and swelling of the submaxillary lymph glands. Clinically, they cannot be differentiated; and yet they differ most markedly. One form, distinguished by the diphtheria bacillus, is extremely dangerous and fatal; while the other, exhibiting only the presence of staphylococci and streptococci, is comparatively mild and little dangerous to life.

2. These forms can be distinguished, one from the other, only by cultures

of a fragment of membrane in Löffler's blood-serum, after several light rinsings in a two per cent. boric acid solution.

3. It would appear judicious to apply to the form characterized by the presence of cocci alone, the term already in use among French writers—"diphtheroid."

Touching the etiology of the so-called rhinitis fibrinosa, Baginsky has found, in three cases of this kind examined, the presence of Löffler's bacillus in each instance, and he therefore regards it as a truly diphtheritic process.

Of especial interest is the result of his study of the relationship of cases of scarlatinal diphtheria to true diphtheria. In no case of primary scarlatina exhibiting diphtheritic deposits in the pharynx could Löffler's bacillus be demonstrated, but cocci were frequently found in cases which presented all the naked-eye appearances of true diphtheria. On the other hand, several instances were found where children brought into the hospital with diphtheria and showing Löffler's bacillus in the cultures, suddenly exhibited a scarlatinous exanthem, while at the same time the pharyngeal affection lost its true pseudo-membranous character, and the deposit assumed a more greasy consistence and a dirty gray or greenish color. In such cases fresh examinations failed to show the bacillus previously demonstrable, nothing but cocci being found in these cultures. The natural conclusion would, therefore, be that a new contagium had overcome and supplanted the diphtheritic contagium. In view of these facts, the question at once arises, Was not the true scarlatinal contagium contained in the cocci present in the pharynx?—whether it be considered that these cocci had a specific character, or that they were of an already known species which, under peculiar influences, had developed a power of overwhelming the system with a toxine capable of generating a scarlatinous exanthem upon the skin. In the light of our knowledge of the property of certain drugs to produce a scarlatiniform eruption, these observations suggest to the author a new line of research touching the obscure etiology of scarlatina.

The Facialis-phenomenon in Childhood.

Some interesting observations have been recorded by Johann Loos (*Wiener klinische Wochenschrift*, 1891, No. 49, p. 915) in regard to the occurrence of this asserted pathognomonic sign of tetany in other affections of childhood. In eighty cases of diseases in no way presenting the other symptoms of tetany he was able to elicit this sign, forty-six of the patients being girls and thirty-four boys. Only five were under one year of age, while the others ranged from one year to seventeen years. Direct excitation of the nerve was obtained by percussion at a point above or external to the labial commissure. Dividing the cases into three general groups, the author was able to demonstrate this sign as follows:

1. In functional neuroses: neurasthenia, nine cases; hysteria, nine girls; chorea, two cases; in three girls who had had tetany during the previous winter; and, finally, in two boys with epilepsy.

2. In organic diseases of the nervous system: encephalitis, idiocy with spastic contractures, peripheral neuritis, glioma of the brain, disseminated

sclerosis, tubercular meningitis of the base, diphtheritic paralysis of the uvula, facial paresis, and hydrocephalus, of each one case.

3. In other morbid states: anæmia, six cases; phlegmonous angina, one case; gastro-intestinal catarrh, three cases; late rhachitis, two cases; typhus, two cases; whooping-cough, scrofula, tuberculosis, and cystitis, of each one case.

In all these cases except four there was an exaggerated excitability of the nerves and muscles; and in twenty-five cases examined separately for the knee-jerk this phenomenon was found increased.

It is scarcely necessary to say that the facialis-phenomenon was not observed in all cases of the above groups examined; but in the functional nervous affection it was quite constant. Apart from diseased conditions, this sign was present in twenty-eight children, some of which, perhaps, were slightly anæmic, but all in ordinarily good health.

Another point of interest brought out by these investigations was the fact that in nine cases the phenomenon was also found in the mother, brothers and sisters of the patient.

Ordinarily the sign could be elicited on both sides, and the duration varied from several days to several weeks. It therefore seems proven that except for tetany this phenomenon possesses no diagnostic value. In certain cases it is the expression of a bad state of health, in others, of an inherited excitability of the nervous system. Whether there be any anatomical lesion of the nerve, like a perineuritis, as Schlesinger believes, must for the present remain an open question.

Nocturnal Enuresis Cured by Excision of Luschka's Tonsil.

Koerner (*Centralblatt f. klin. Med.*, 1891, No. 23, p. 417) reports the cure of nocturnal enuresis in two girls, one nineteen years old, the other three years, following the extirpation of Luschka's tonsil, which in each case was considerably hypertrophied. This cure was immediate and complete. These cases, therefore, illustrate the important part that nasal obstruction may play in the pathogeny of nocturnal enuresis. The coexistence of hypertrophy of Luschka's tonsil and the nocturnal incontinence of urine of childhood (already remarked by Major, Ziem, Bloch, and Schmalz) is, however, so unusual that it is necessary to consider that without the existence of some predisposing weakness of the sphincter vesicæ, adenoid vegetations of the pharynx could not alone excite incontinence.

Cases of Atropine and Opium Poisoning in Early Life.

Rotch (*Boston Medical and Surgical Journal*, 1892, No. 10, p. 231) puts on record several cases of toxic symptoms produced by one or other of these drugs in young children. Two sisters, one nine years old, the other four, were brought to the hospital with the statement that they had drunk between them an ounce of a solution containing two grains of atropine. They had been made to vomit freely by emetics two hours after drinking the solution. On admission to the ward the older child was partially unconscious, pale, with a pulse of 120, of good strength and regularity; respiration was regular, quiet, and about normal in rate; temperature 99°; tongue coated and dry; pupils widely dilated and inactive. Occasional convulsive movements, chiefly con-

fined to the upper extremities, were also observed. This child recovered without treatment by drugs. The younger sister was in a more serious condition, but also recovered after a hypodermatic injection of two minims of Magendie's solution. One-half to one grain of atropine has been considered a fatal dose for an adult. The probability is that these children did not get a grain each; but the bottle had had only a few drops taken out of it before they emptied it. Another little girl, two years of age, was brought to the hospital in the morning with the history that the mother had tried to poison her during the night by giving a teaspoonful of laudanum, that this was vomited, and that the same dose had been repeated, with possibly more later. Respirations were down to six to ten a minute. She recovered under the usual treatment, with the internal administration of strong coffee and subcutaneous injection of several small doses of atropine ($\frac{1}{240}$ gr.). Another child, seven years of age, recovered after the ingestion of $\frac{14}{100}$ of a grain of morphine. While not sufficiently numerous to give data for any conclusions as to the toleration of these drugs in childhood, these records serve to show that the physician need not despair of saving a little patient's life in cases where the amount of the drug ingested seems very formidable.

The Treatment of Hiccough by Digital Compression of the Phrenic Nerve.

Leloir (*Revue Mensuelle des Maladies de l'Enfance*, March, 1892, p. 135) describes a very simple manœuvre which he has used with success in immediately checking obstinate hiccough. The first case in which he observed its happy effect was that of a little girl, twelve years old, who for a year had suffered from intractable hiccough, occurring every half-minute. The left phrenic nerve was strongly compressed for three minutes with the finger between the two sterno-clavicular attachments of the sterno-mastoid muscle. At the end of this time the spasm had completely ceased and did not again recur. The author has tried this plan in a number of acute and chronic cases, and always with success.

Corrigendum.—On page 251 of the March issue of the Journal, for the description of Fig. 7 (Maunsell, "Intestinal Surgery") should be substituted, "Representing the junction of large and small intestine by circular enterorrhaphy."

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